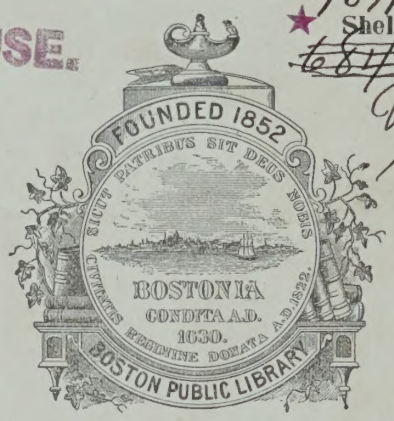

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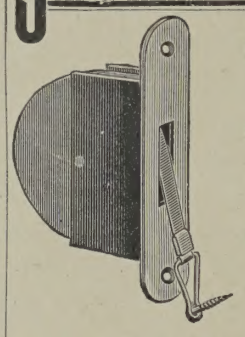

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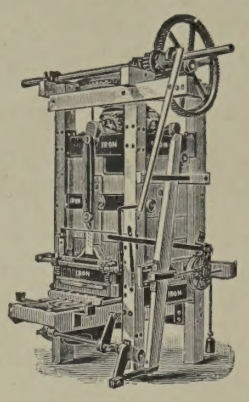

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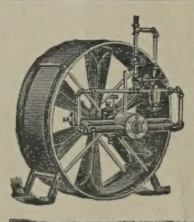

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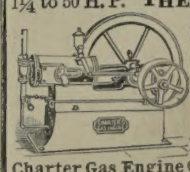

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☞ See Alphabetical Index to Advertisers in present Number on page xiv.

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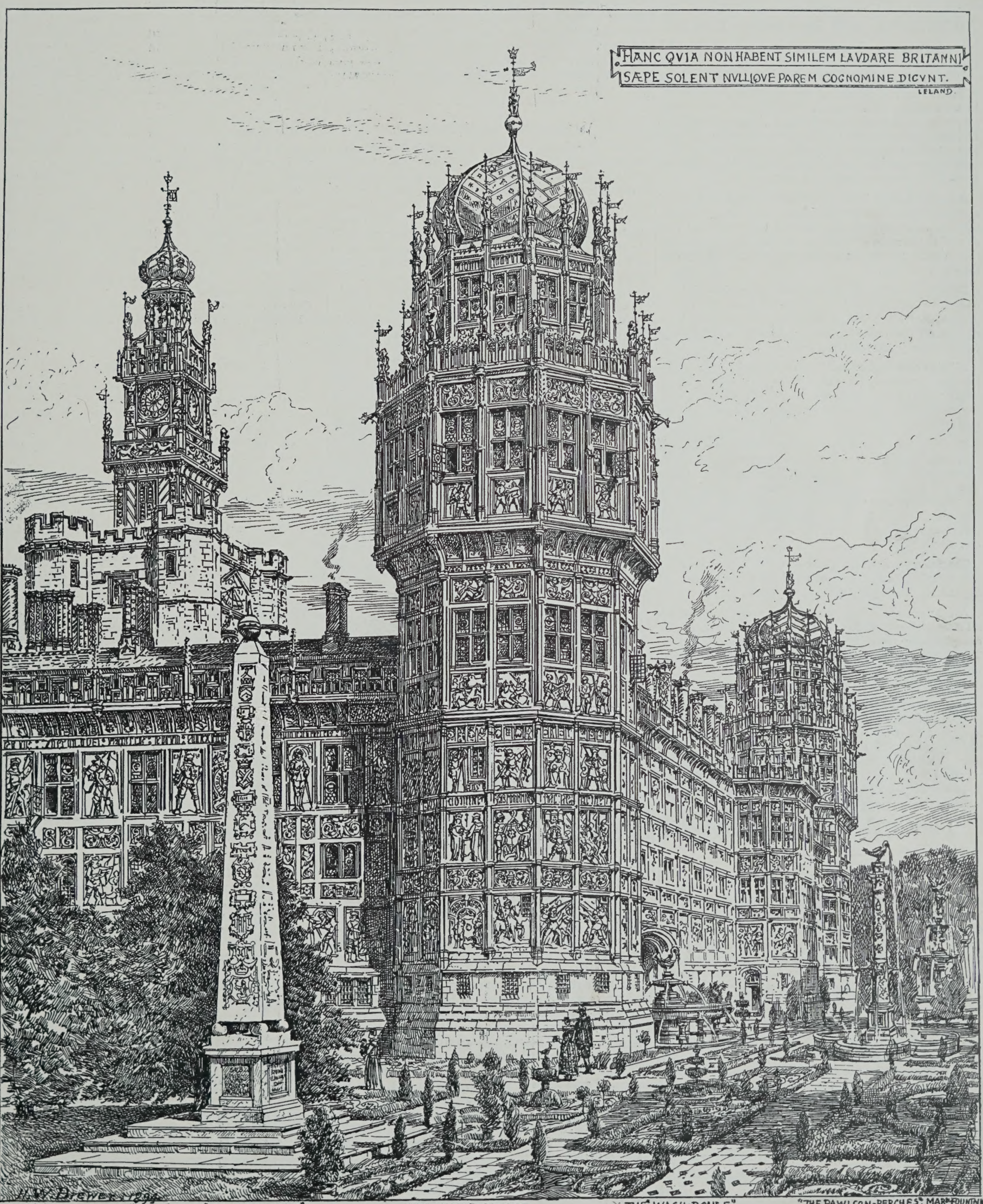

NONSUCH PALACE.—See page 13.

Scientific American.

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NEW YORK, JULY, 1894.

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CONTENTS

Of the July number of the ARCHITECTS AND BUILDERS EDITION of SCIENTIFIC AMERICAN.

(Illustrated articles are marked with an asterisk.)

A SUMMER COTTAGE.

This forms the subject of one of our plates in colors. The house is built of stone up to the second story, the substructure being of frame, covered with shingles. A piazza runs almost entirely round the house. A large, plain roof covers the whole, being supported over piazza by circular columns. Dormers in the roof give light to the interior. In the interior the accommodation provided is a main hall, containing main staircase and giving access to dining-room, parlor and library, the two latter communicating by means of sliding doors. The kitchen is placed in a rear hall, and communicates with dining-room through butlery. The service staircase is placed in rear hall. On the second floor six bedrooms are provided, each having a store closet. A bath, washbasin and water-closet are provided for in one room. The third floor, which is reached by the continuation of main staircase, contains store rooms, servants' rooms, etc. The es imated cost is $4,500. Our perspective in colors and the floor plans were supplied to us by Mr. H. Howard, architect, No. 31 Broadway, New York, who will give information where the house is located and other particulars.

A DWELLING AT MELROSE, PA.

One of our plates in colors this month illustrates the residence of W. H. Miller, Esq., at Melrose, Pa. On page 1 we also give an additional new. The design is treated in the Queen Anne style, has a well shaded veranda, balcony, numerous dormer windows, and brick chimneys, effectively corbeled and capped with stone. The underpinning and more prominent portion of first story are built of rock-faced local stone. The exterior framework is covered with sheathing, felt paper and clapboards on first story, second story being shingled; roof, gray slate. Dimensions: Front, 43 ft.; side to line of bay, 62 ft. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft. 6 in.; attic, 8 ft. 6 in. The interior arrangement is very complete. A large reception hall, with angle fireplace, tiled hearth, ornamental newel and staircase, is well lighted by two large windows with stained glass transoms, the windows on landing being all stained glass of special design. A broad arch opens to parlor, with a bay its full width. Angle fireplace and sliding doors to dining-room. This room has a square bay with seats. Butler's pantry has dresser and sink. Kitchen is complete with all fixtures. Second floor contains four good sized bedrooms and bath. First and second floors finished in quartered oak, trim being of special design. There are three rooms in attic trimmed in white pine, hard oil finish. The plumbing is all exposed, and all work throughout is of the very best. Cellar is cemented and contains furnace, fuel storage, etc. The house is lighted by electricity. Clapboards are painted light yellow, shingles stained snuff color, with hip moulding and trimming color light yellow. Columns and balusters are natural oiled finish. A. M. Walkup, Philadelphia, Pa., was the architect and builder. Cost $8,500.

Our engravings were made direct from photographs of the buiiding, taken specially for the SCIENTIFIC AMERICAN.

HALF-TIMBERED HOUSE, ROSEMONT, PA.

We publish on page 5 a half-timbered residence, erected by John H. Converse, Esq., at Rosemont, Pa., at a cost of $11,000. Dimensions: Front, 49 ft. 4 in.; side, 60 ft. 4 in. Heights: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft. The underpinning and first story are of uncoursed rock-faced stone, light gray in color. The second story is of pebble dash plaster, natural color, timbers being light brown; trimming color, dark brown. The boards of porch gables are elaborately carved. The fine detail in the numerous gables is greatly relieved by the broad treatment of the first story. Roof is of red slate; chimneys are ornamental in design, and built of brick, capped with stone. There is a good sized entrance porch, well shaded, with a unique rounded projection. An arched front doorway; vestibule, tiled and finished in oak, with seat at side, leads to hall through a 7 ft. glazed double door. Parlor finished in white pine, enameled. Dining-room and hall, as well as study, are finished in selected chestnut. Pantry and kitchen, yellow pine. Open fireplaces with tiled hearth in every room. Mullioned windows, casement hung, with leaded glass transoms, are interesting features. Hall has lavatory, etc., a broad arch, ornamental newels, a seat on landing, and a staircase of easy rise. Kitchen is conveniently arranged. Second story is divided into five good sized bedrooms, with open fireplaces and ample closet accommodations in each. Large linen closet with shelves and drawers. Bathroom has all desirable fixtures, plumbing exposed and of the best. The house is fully provided with electric bells, speaking tubes and gas. Interior hardware is of copper-bronzed iron; exterior, galvanized iron. All marble is of selected Italian. House is heated from furnaces in cellar, which is cemented, and contains laundry, storage-room, etc. Mr. Theophilus P. Chandler, Jr., architect, Philadelphia, Pa.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT EDGEWATER, ILL.

The engravings on page 7, with accompanying floor plans, illustrate a residence recently erected for G. F. Lange, Esq., at Edgewater, Ill. The elevations show a design treated in a thoroughly substantial manner, with the lines sufficiently broken and ornamented with a well shaded piazza, bay windows and oriel to give it an artistic and pleasing appearance. The underpinning and first story are built of rock-faced stone of a light gray color. The second story is sheathed, covered with shingles and then painted light yellow. The third story is shingled and stained mahogany color. Roof shingled and stained moss green. Dimensions: Front, 38 ft. 6 in.; side, 47 ft. 6 in., exclusive of front piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The vestibule, hall and reception hall are trimmed with oak, the former having a paneled wainscoting and a hardwood floor. The reception hall contains a paneled divan, an ornamental staircase with a broad, low rise, carved newels, and a fireplace furnished with a tiled hearth and facings and a mantel of oak, designed in an artistic manner. The toilet is conveniently located. The windows on first story have transoms glazed with leaded glass. Other windows are glazed with plate glass. Parlor, trimmed with whitewood, is treated with ivory white and gold. It has an open fireplace with tiled trimmings and a dainty mantel. Dining-room, trimmed with oak, has a paneled wainscoting, hardwood floor, and fireplace. Kitchen and pantries are trimmed and wainscoted with yellow pine, and are furnished complete. The second floor is finished in a first-class manner, and it contains four large and well lighted bedrooms, seven closets and bathroom. Bathroom is wainscoted and provided with the usual fixtures. There are two bedrooms on third floor, besides ample storage. Cemented cellar contains furnace, laundry and other necessary apartments.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT HARTFORD, CONN.

We present on page 8 engravings and floor plans of a Colonial cottage erected for W. F. Goody, Esq., at Hartford, Conn. The design has many attractive features, including a pleasant porch and bay windows. Underpinning and first story are built of local brick, laid up in red mortar. The superstructure above, of wood, is shingled and stained a moss green. Roof shingled and stained similar. Dimensions: Front, 33 ft.; side, 38 ft. 4 in., not including piazza or porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9; third, 8 Cemented cellar under whole of house. It has a brick partition running through the centre of the cellar, and it contains laundry with tubs, furnace room, provided with furnace coal bins and other necessary apartments, which are fitted up replete. The interior throughout is trimmed with white pine. Hall is finished in oak. It contains a staircase of handsome design, turned out of oak, and lighted effectively by a cluster of stained glass windows. Parlor is treated in ivory white. It has an open fireplace, furnished with hearth and facings of white enameled tiling, and a Colonial mantel with columns and mirror. Dining-room is furnished natural, and it has a fireplace built of brick, with tiled hearth and oak mantel. It has also a balcony. Butler's pantry is fitted up in a most complete manner with drawers, countershelf, dresser and cupboards. Kitchen is wainscoted and all woodwork is finished natural. It has sink, closet, dresser and broom closet. The woodwork on second floor is finished natural, and it contains four bedrooms, with ample closets and bathroom. Bathroom is wainscoted and provided with the usual fixtures, exposed plumbing. The fireplaces are built of brick, with hearths of same, and they have hardwood mantels. Two bedrooms and trunk room on third floor. The walls are sand finished, and are tinted in delicate colors. Cost $4,750, including furnace and everything complete, ready for occupancy. Mr. Henry D. Hooker, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT JAMAICA, LONG ISLAND.

The engraving and floor plans presented on page 4 show a dwelling recently completed for B. S. Waters, Esq., at Jamaica, Long Island. The perspectives show a popular design of American style. The underpinning is built of rock-faced stone, laid up at random in white mortar. The first story is clapboarded, while the second and third stories are covered with shingles, and painted pearl gray, with white trimmings. Roof, slated. Dimensions: Front, 38 ft; side, 40 ft. 6 in., not including front piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The first floor is trimmed with ash, and the second and third floors are trimmed with white pine, finished natural. Vestibule is paneled in ash. The doors and windows have heavy moulded casings. Hall has a paneled wainscoting, and it contains an ornamental newel and candelabrum. Parlor and library have open fireplaces, trimmed with tiled facings and hearths. The mantels are designed in the Colonial style, with columns and mirrors. Dining-room, spacious, has a china closet. Kitchen and pantries are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures. Second floor contains four bedrooms, closets, dressing-room, and bathroom, the latter wainscoted and fitted up replete. There are two bedrooms and trunk room on third floor. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost, $5,800 complete. Messrs. Daus & Oborne, architects, 26 Court St., Brooklyn, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT YONKERS, N. Y.

Our plates on page 9 illustrate a residence recently erected for Cheever N. Ely, Esq., at Yonkers, N. Y. The building is located on "Warburton Terrace," overlooking the Hudson River, and is a suitable design for this location, with its spacious piazza, its many balconies, and the outlook towers on either corner. The foundation wall is 20 inches thick, and is built of local granite, rock-faced, doubled axed, and laid up in blue mortar to correspond with the color of stone. The exterior framework is covered with sheathing, laid on diagonally. The sheathing is covered with felt building paper, 1¼ inches thick, and then clapboarded and shingled, and painted Colonial yellow, with ivory white trimmings. The blinds are painted bottle green. The roof is shingled and painted slate color. Dimensions: Front, 36 ft.; side, 50 ft., not including piazza. Height of ceilings: Cellar, 8 ft; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The partitions throughout the exterior walls are filled in with mineral wool, 4 inches thick. The interior walls are filled similar, but only to a height of 6 feet. The floors throughout are laid double, with building paper an eighth of an inch thick between same. The upper floor on first story is laid of oak and highly polished, while the upper floors on second and third stories are laid with yellow pine. The hall is trimmed with quartered oak. It has a paneled wainscoting and ceiling beams. The staircase is an ornamental one, with carved newel, posts and columns extending to ceiling with an arcaded effect. The parlor is treated in cream white and gold, and the library in ivory white. The fireplaces in these apartments have mantels with columns to correspond with trim, and they are also provided with tiled trimmings. Dining-room is trimmed with antique oak, and it has ceiling beams and fireplace with tiled hearth and facings, and mantel of oak. There are several very handsome stained glass windows in these apartments and elsewhere. The other windows are glazed with plate glass. The butler's pantry is of unusual large dimensions, and it is well fitted up with drawers, dressers, and shelves, inclosed with glass doors. Kitchen and its apartments are trimmed and wainscoted with Georgia pine, finished natural, and they are furnished with the best modern improvements. Kitchen is provided with a "Richardson range." The second floor is cabinet trimmed and finished in cherry, with the exception of two bedrooms, which are treated in colors. This floor contains four bedrooms, closets, and bathroom. The latter is wainscoted in oak, and is provided with porcelain tub and other fixtures, with exposed plumbing, all nickel-plated. Each bedroom has a transom over entrance door. The third floor contains billiard room and three bedrooms The house is trimmed with bronze hardware, and it is fitted up with electric bells and lighting, speaking tubes and burglar alarm. The chimney flues have circular tile flues, and the fireplaces have patent chimney backs. Cemented cellar contains furnace and other necessary apartments. The furnace pipes are double, separate for each register, and are protected by iron lath and tin. Mr. Augustus Howe, architect, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT HACKENSACK, N. J.

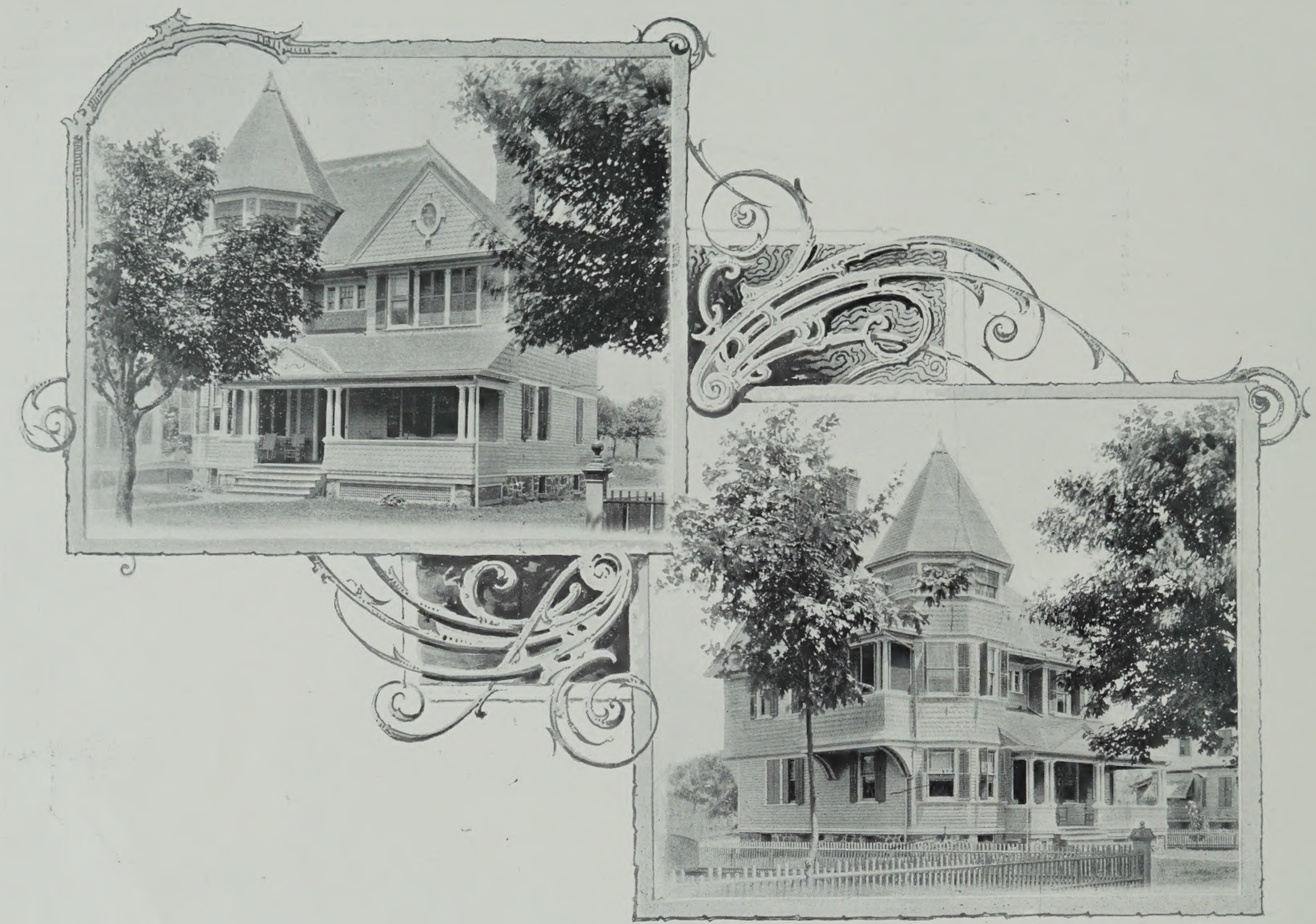
We publish on page 6 engravings and floor plans of a dwelling recently erected for Mrs. Maria Bogart, at Hackensack, N. J. The design presents a good example for a model dwelling. It combines both pleasing elevations and well arranged plans. The balcony, bay windows, and piazza are good features. Foundation, stone; underpinning, brick. First story, clapboards, and painted olive yellow; second and third stories, shingled, and painted Colonial yellow. Trimmings, painted ivory white. Blinds, painted bottle green. Roof, shingled, and left to weather finish. Dimensions: Front, 31 ft. 6 in.; side, 38 ft., not including front piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with whitewood, finished natural. The hall contains an ornamental staircase turned out of ash. This hall is lighted with a stained glass window. The floor is laid with yellow pine in narrow widths. The parlor and library are connected with double sliding doors. The side entrance and stairway is a convenience. Dining-room has an open fireplace, furnished with tiled trimmings and a mantel. This room has a hardwood floor. Kitchen and pantries are wainscoted, and are fitted up in the best possible manner. The second floor contains four bedrooms, large closets, and bathroom, the latter containing the usual fixtures. Third floor contains one bedroom and ample storage. Cemented cellar contains furnace and other necessary apartments. Mr. W. L. Stoddard, architect, Tenafly, N. J.

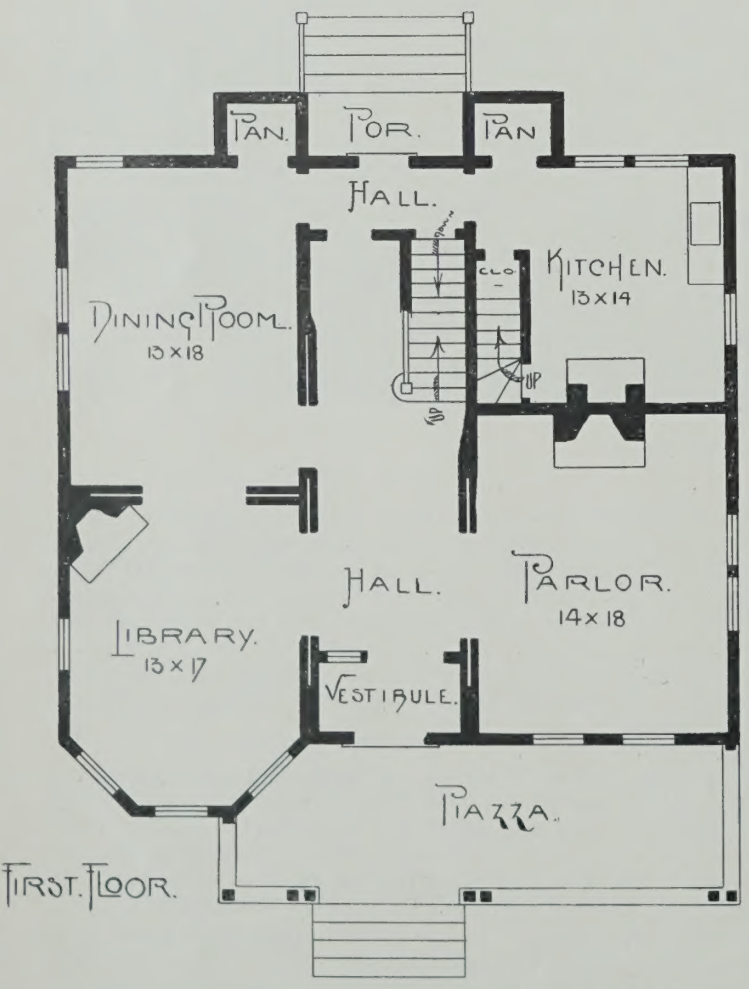
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

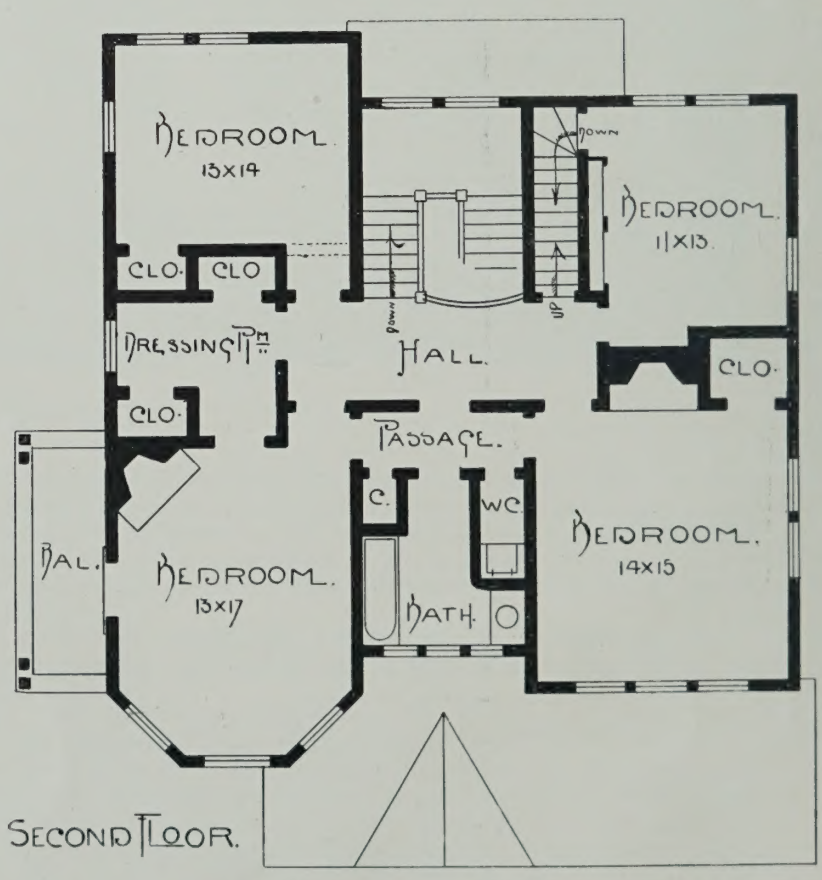
A DWELLING AT MELROSE, PA.—See page 2.

THE city of Caracas, in Venezuela, has lately been the scene of much rejoicing over the opening of a new railway between that place and Valencia, in the interior, a distance of about 111 miles. Many difficulties in the construction had to be overcome, owing to the mountainous nature of the route. Several important bridges, tunnels, and viaducts were constructed. The road opens up a very rich and important agricultural region. The road was built under the auspices of a German corporation.

A SHIP which loaded recently at Wilmington, Del., for Brazil, had as part of her cargo five locomotives, 25 first-class passenger cars, and 180,000 feet of lumber.

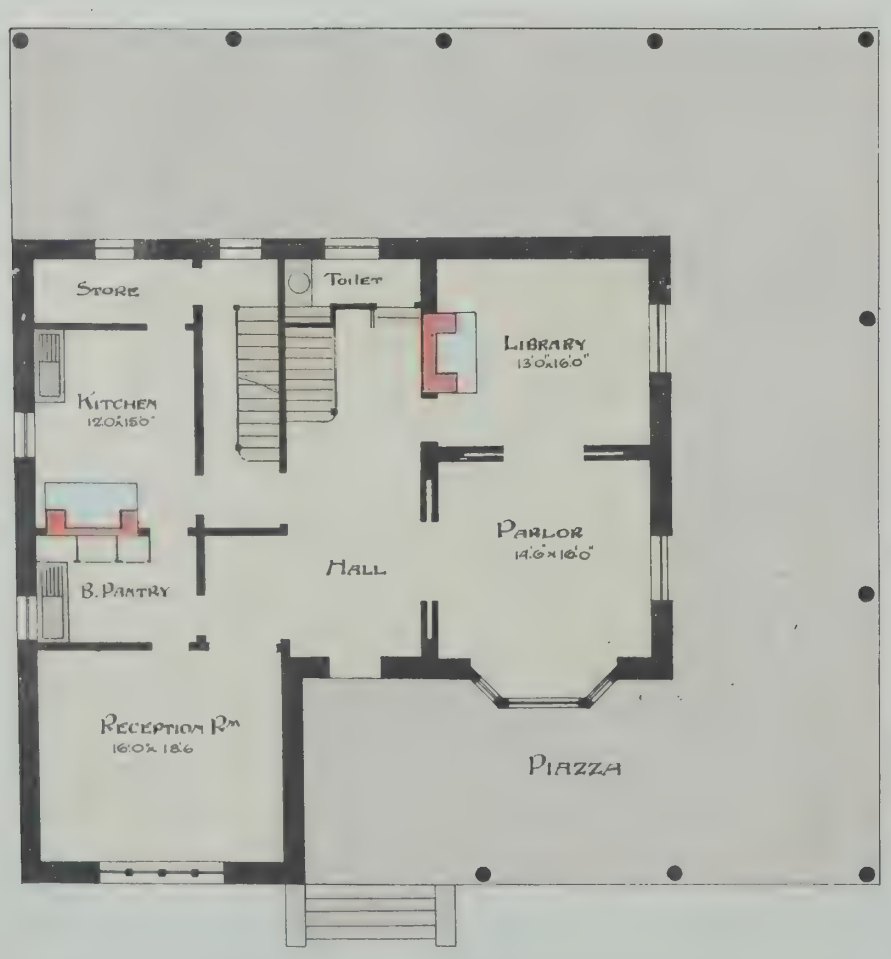






A COTTAGE AT JAMAICA, L. I.—See page 3.

A SUMMER COTTAGE

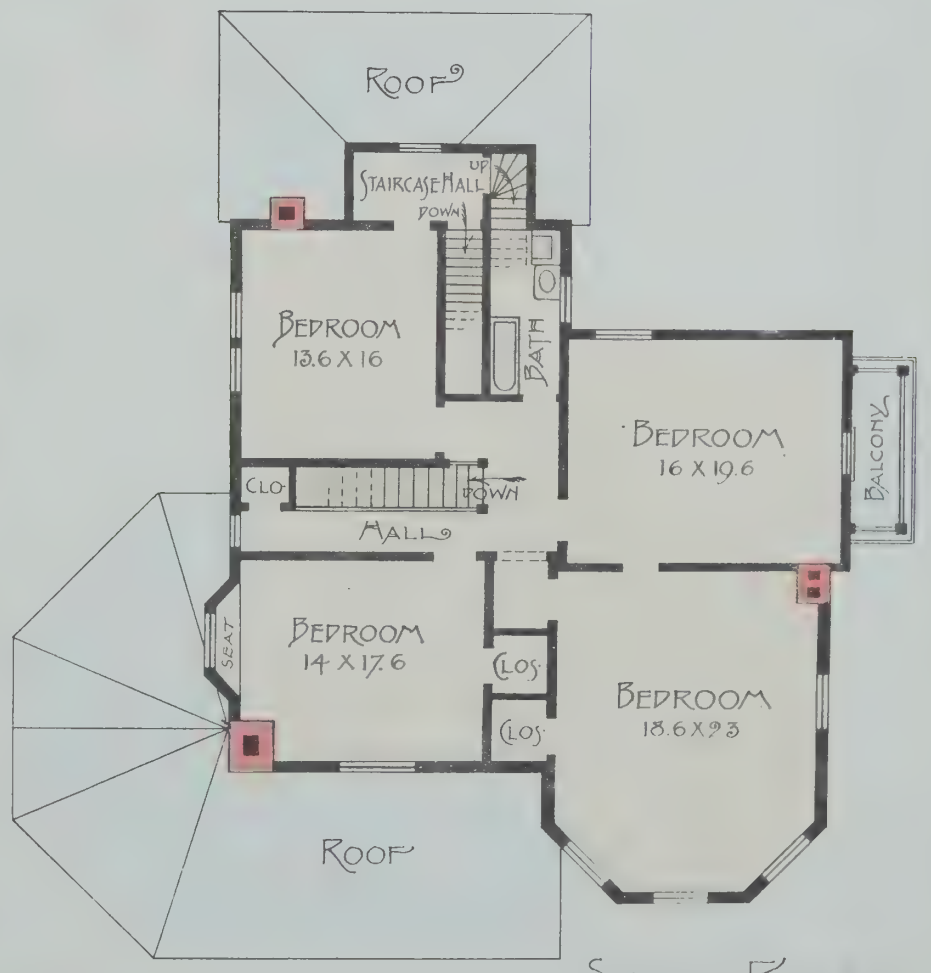


FIRST STORY PLAN

SECOND STORY PLAN

A DWELLING AT MELROSE, PA.

FIRST FLOOR.



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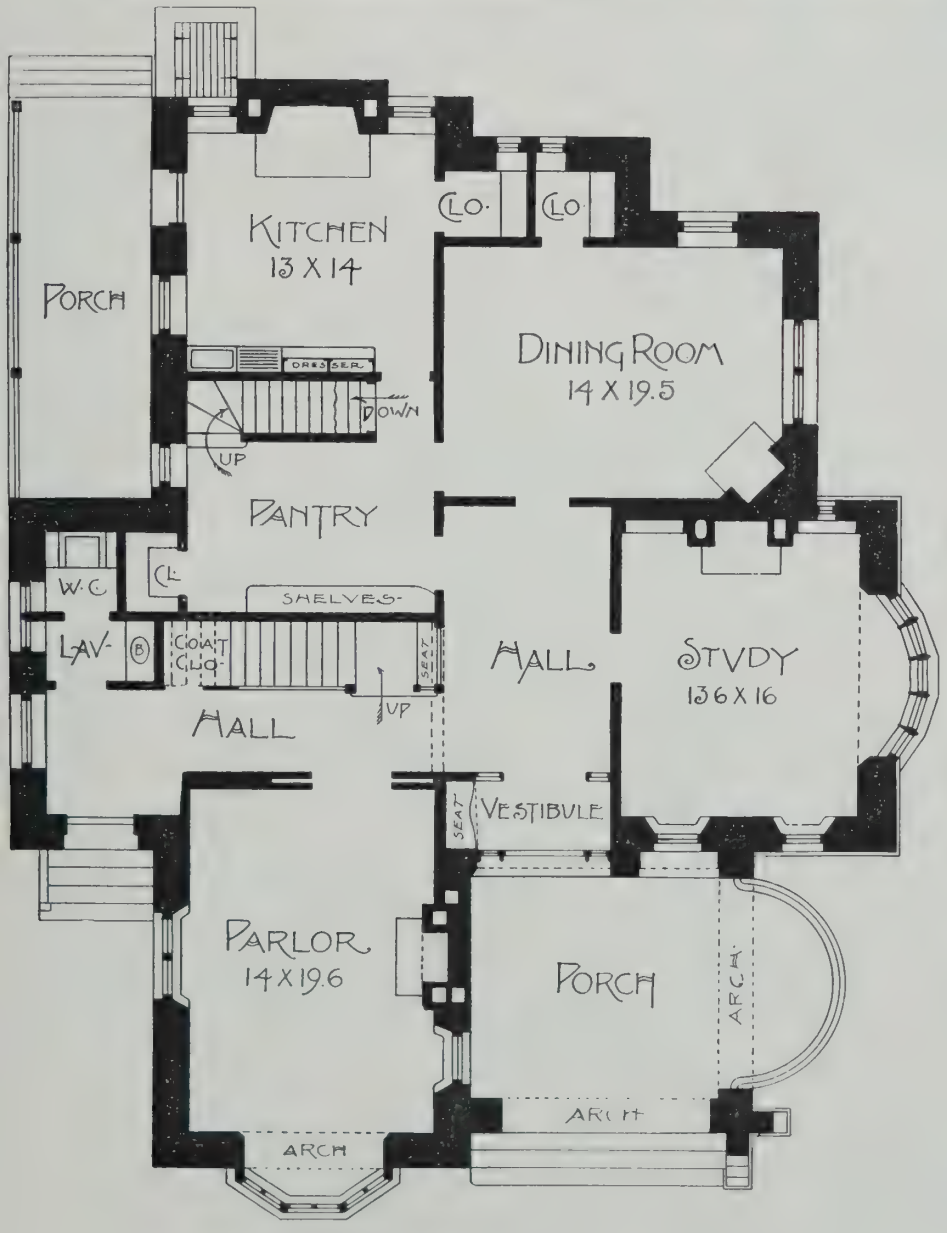
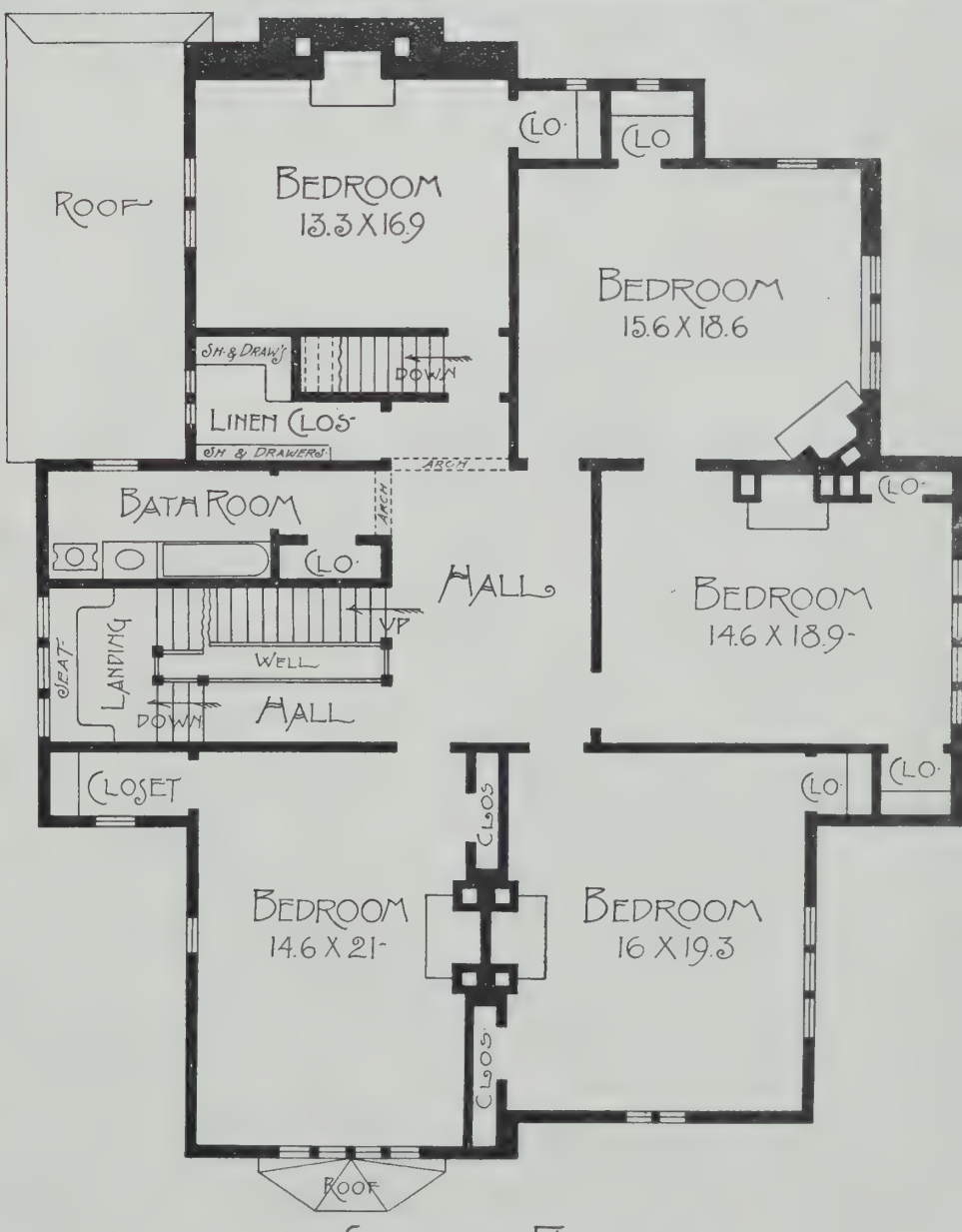
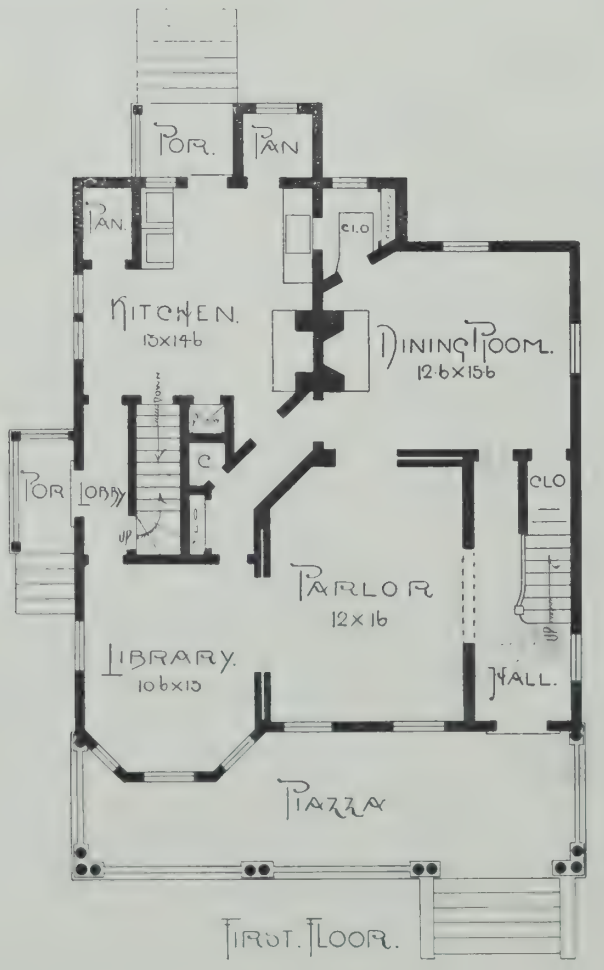


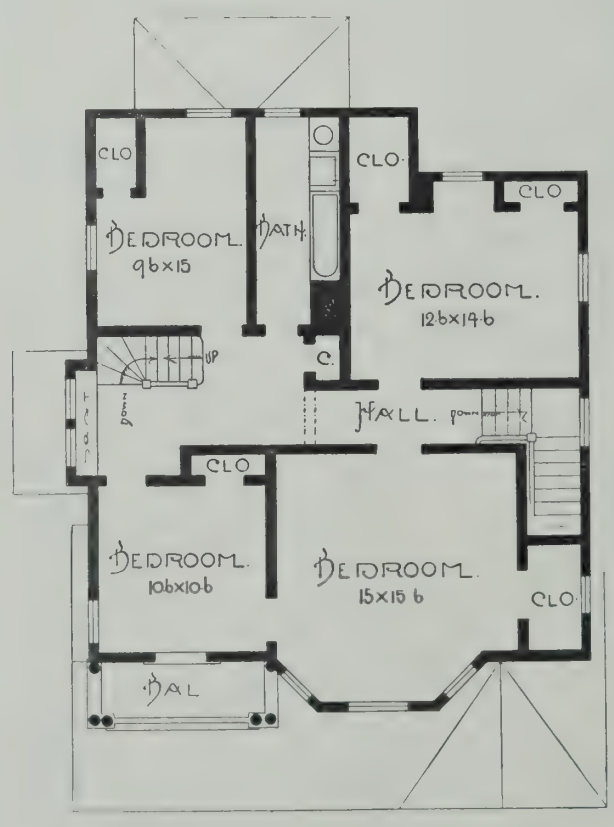
FIRST FLOOR.



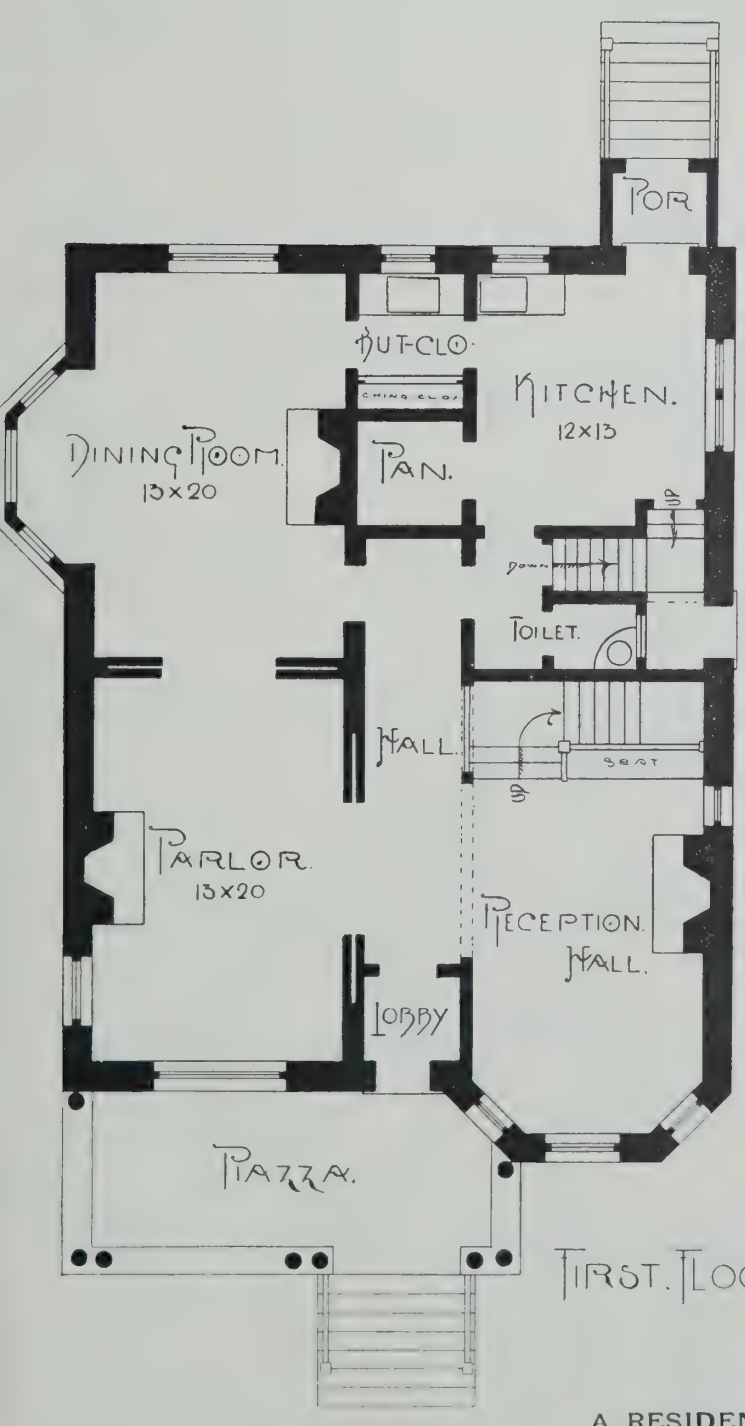
SECOND FLOOR.

HALF-TIMBERED HOUSE, ROSEMONT, PA.—See page 2.





A DWELLING AT HACKENSACK, N. J.—See page 3.



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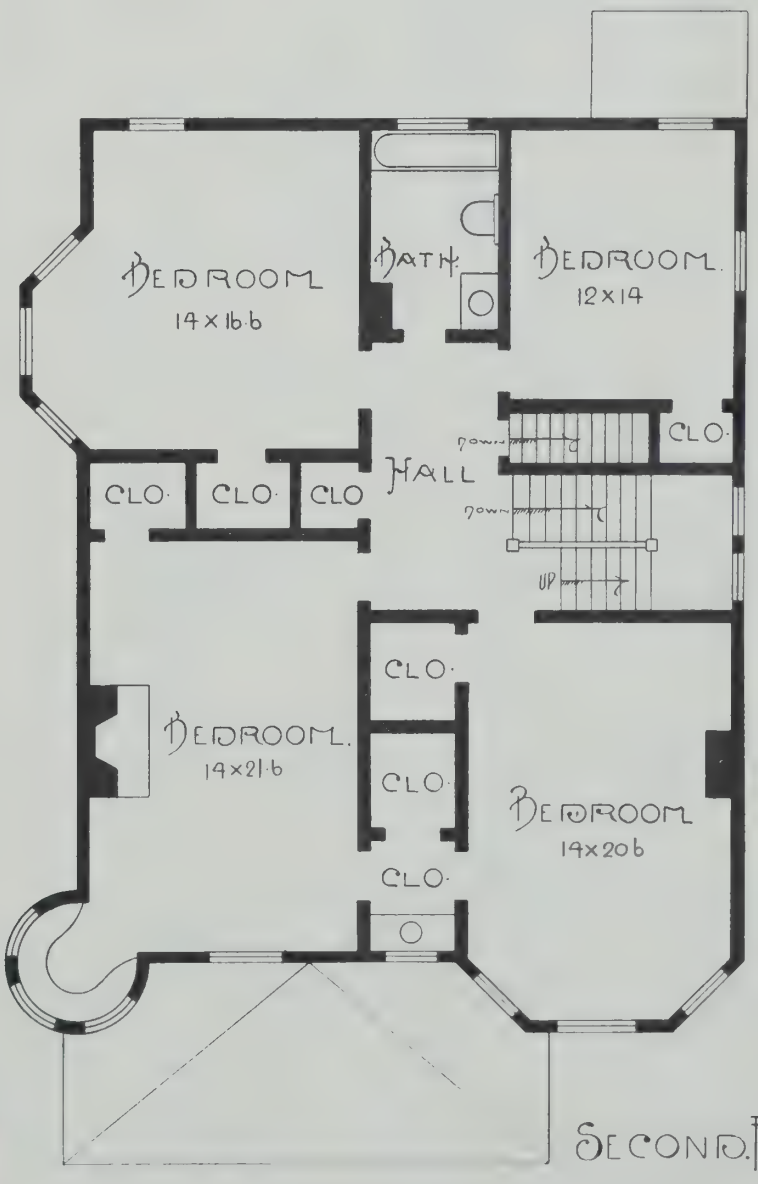
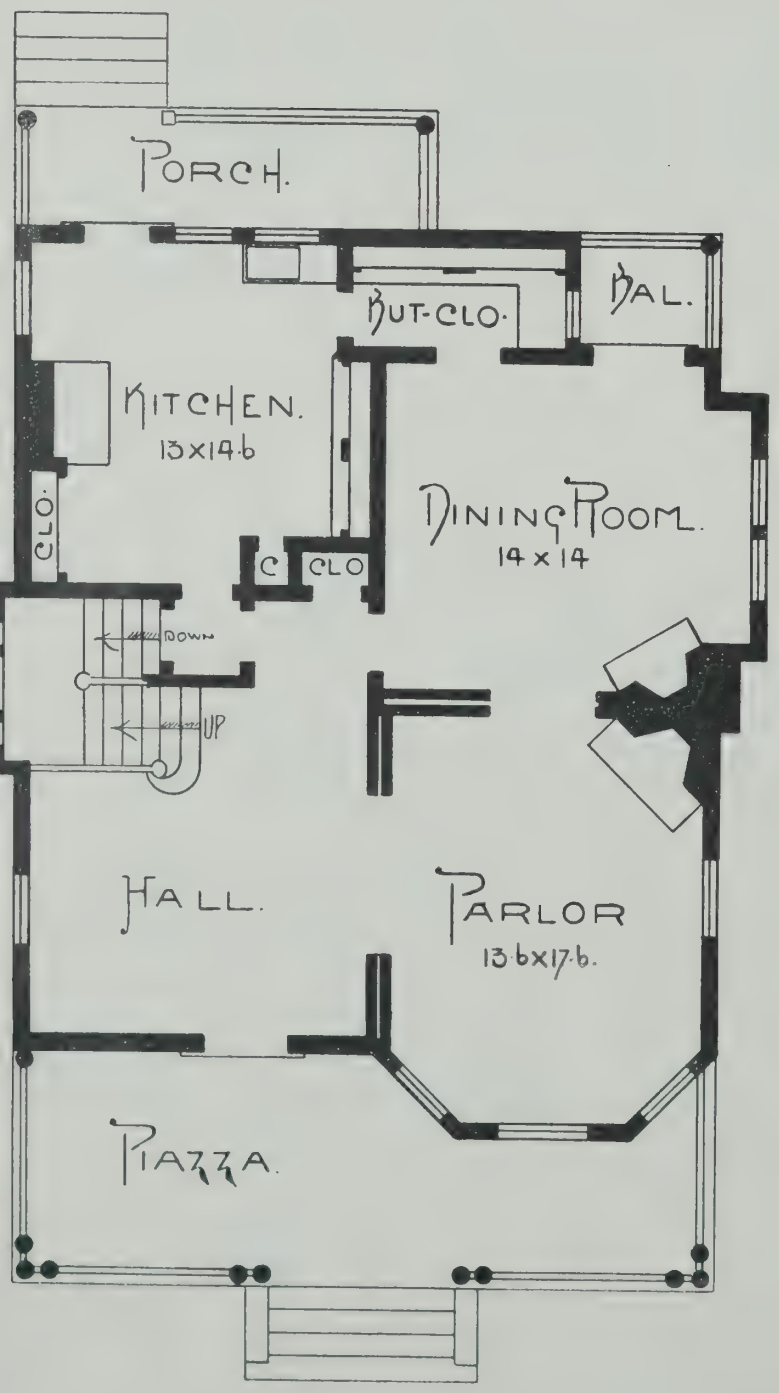
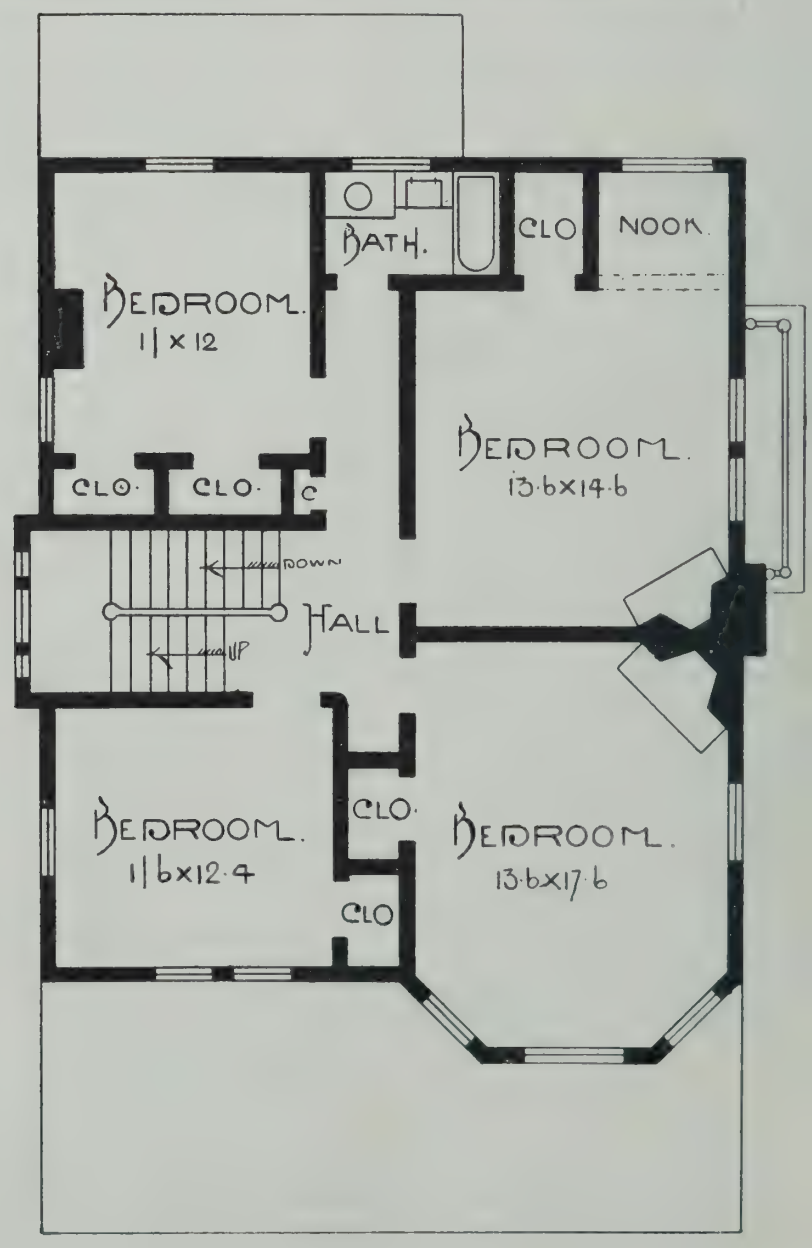


SECOND. FLOOR.

A RESIDENCE AT EDGEWATER, ILL.—See page 2.

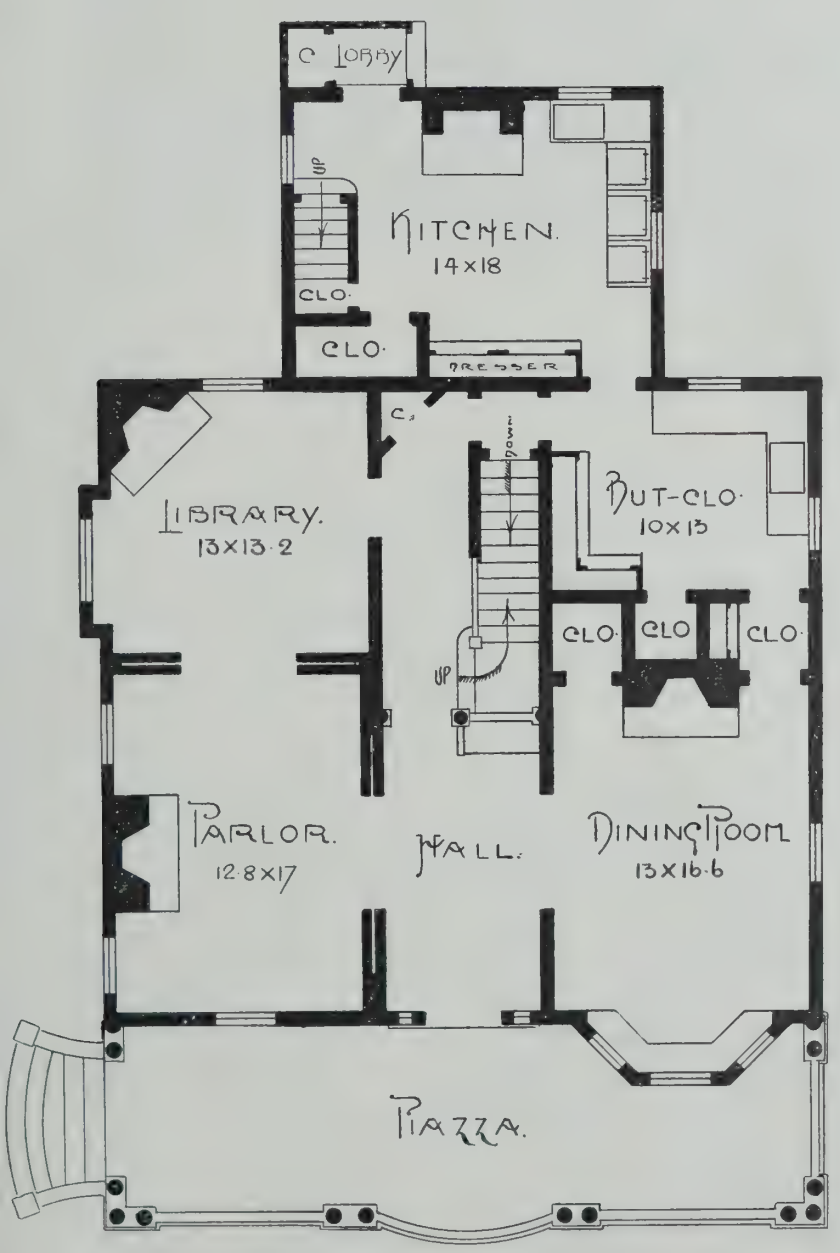




FIRST FLOOR.

SECOND FLOOR.

A COTTAGE AT HARTFORD, CONN.—See page 2.



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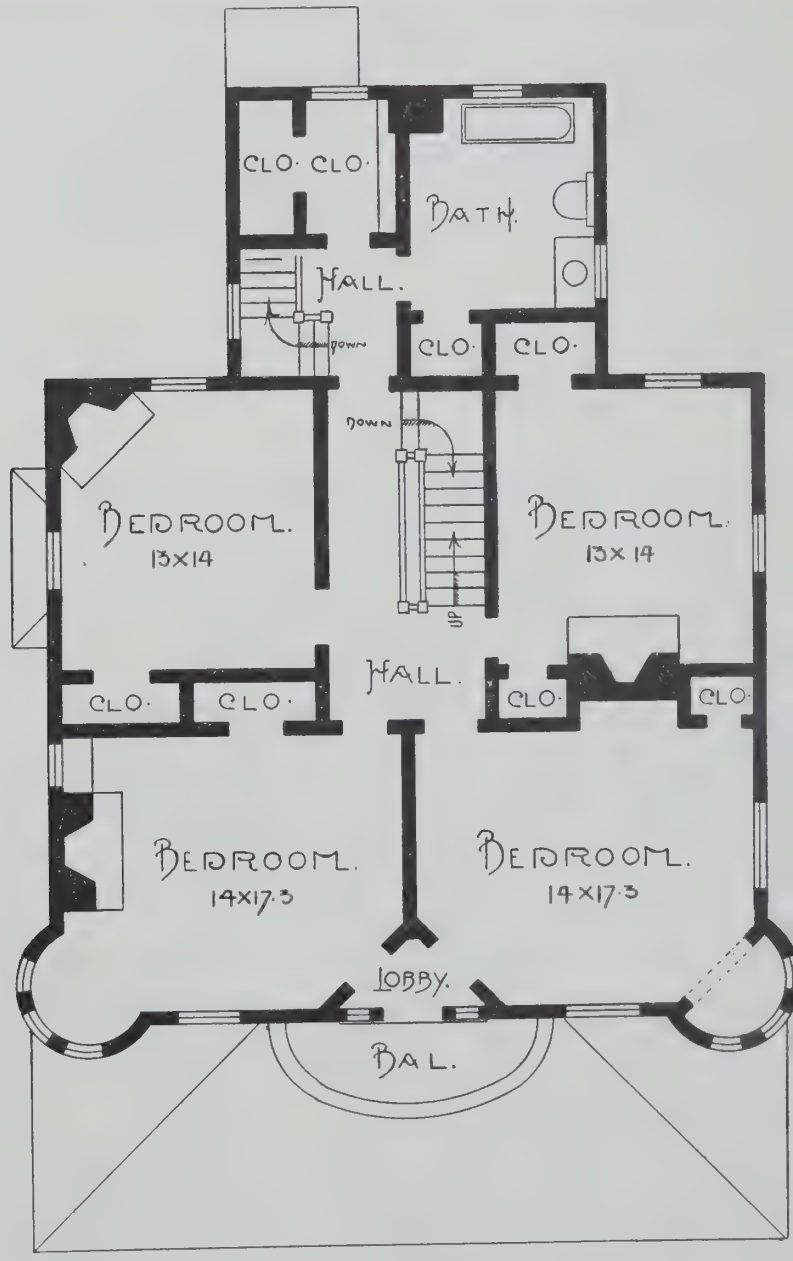
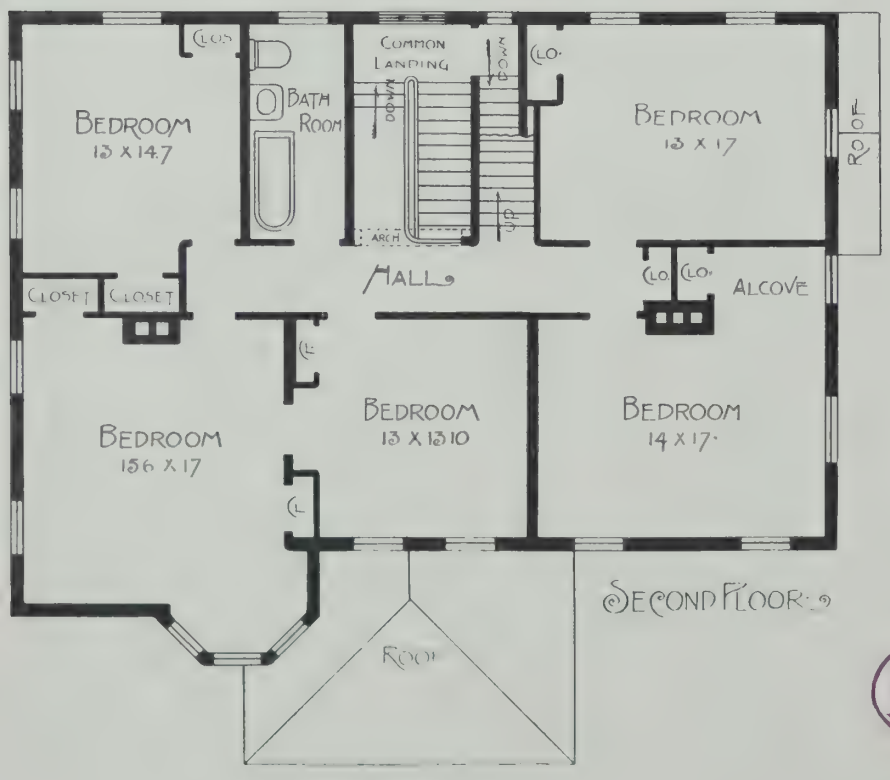
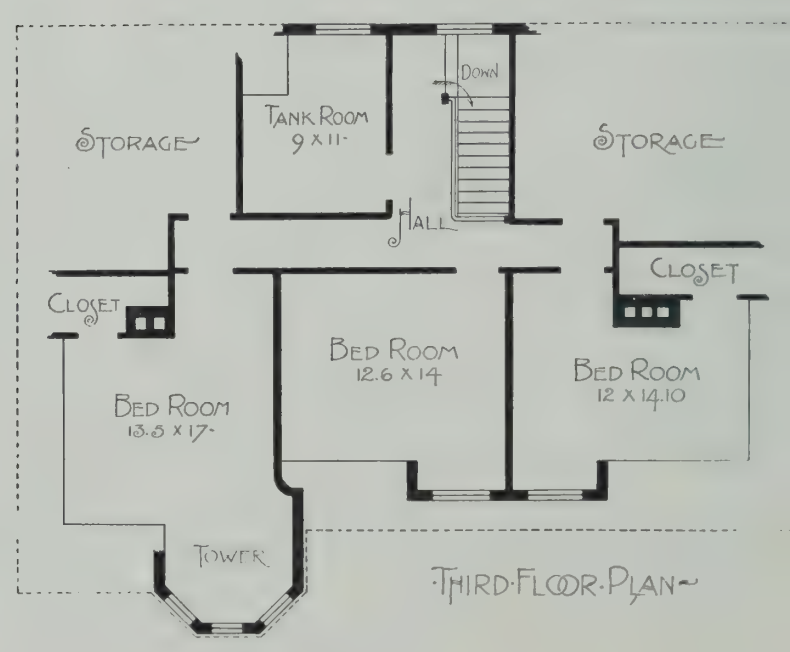


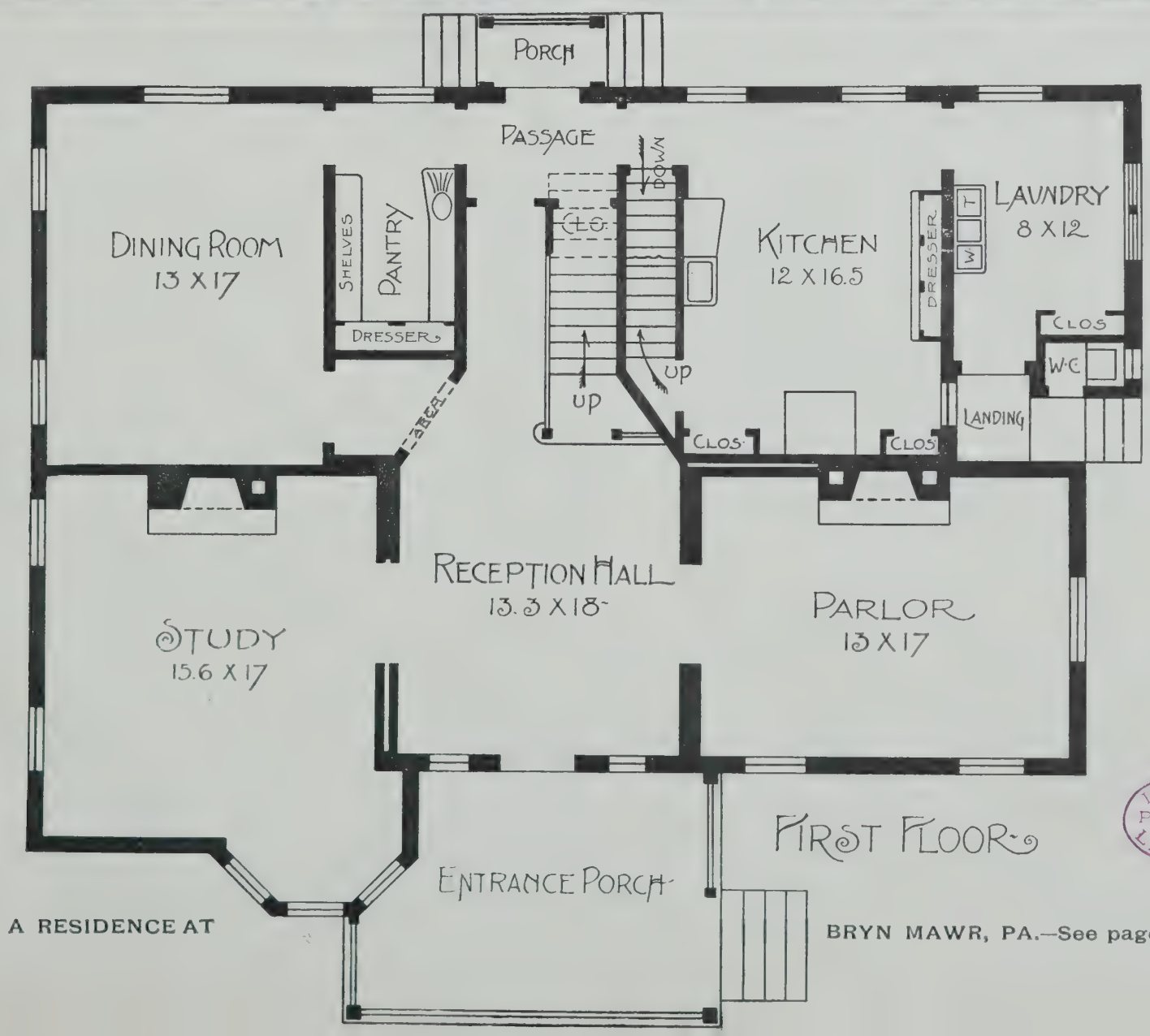
SECOND FLOOR.

A RESIDENCE AT YONKERS, N. Y.—See page 3.

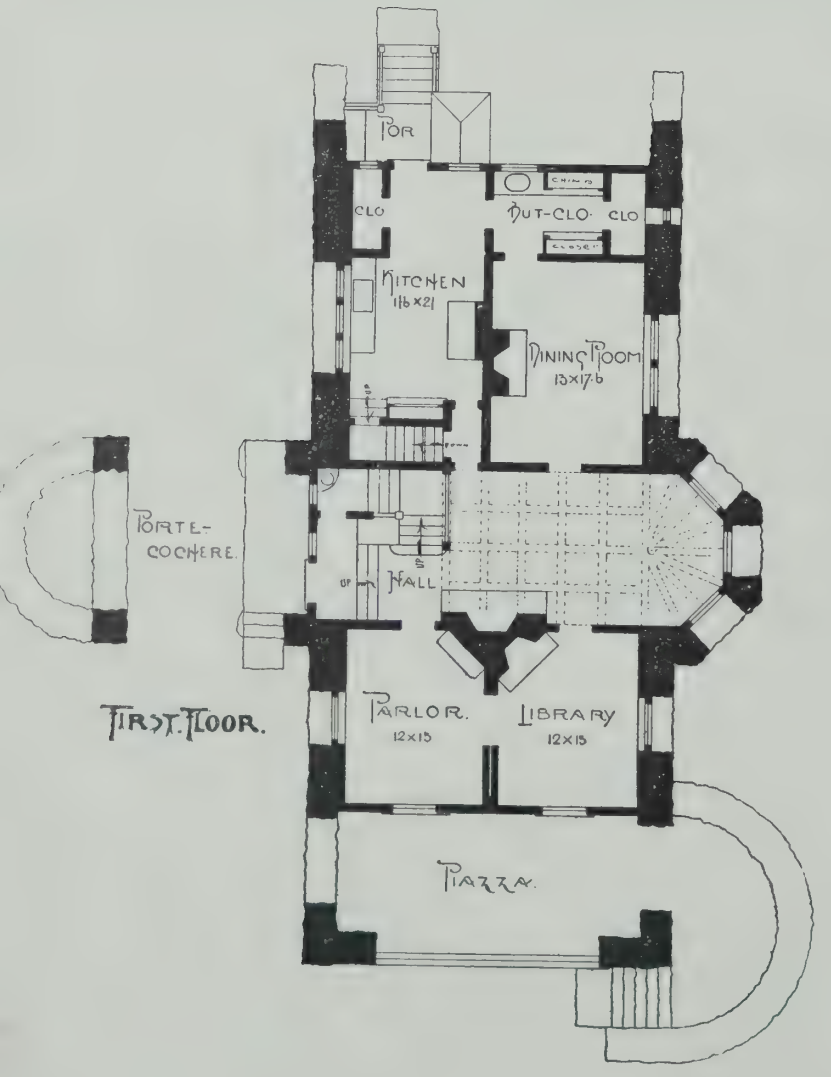




A RESIDENCE AT BRYN MAWR, PA.—See page 13.



A RESIDENCE AT BRYN MAWR, PA.—See page 13.



FIRST FLOOR.

SECOND FLOOR.

A COTTAGE AT GREENWICH, CONN.—See page 13.

RESIDENCE OF PROF. H. W. SMYTH, BRYN MAWR, PA.

On pages 10 and 11 we illustrate the residence of Prof. Herbert Weir Smyth on the grounds of the Bryn Mawr College, Bryn Mawr, Pa. The various views show a house of good design, and, although quite plain, of pleasing appearance. Dimensions: Front, 49 ft.; side, 35 ft. 9 in. Heights: Cellar, 8 ft.; first story, 10 ft. 6 in.; second, 9 ft.; third, 8 ft. The underpinning is of local rock-faced stone. Above this point the building is constructed with hemlock studding, sheathed on the outside with one-inch "Mackite" boards, on which dashwork in cement and sand is placed, the surface being colored after application of cement. The inside of the studs is then covered with heavy sheathing paper, lapped, and then lathed with ¾-inch "Mackite" boards, plastered with adamant plaster. Ceilings are similarly treated. Roofs and dormers are of cedar shingles left to weather; chimneys of vitrified buff brick, with terra cotta topping blocks. House has rear entrance porch, facing road; the front porch of ample dimensions, and tower, facing college. There is a spacious reception hall, with sliding doors to study and broad openings to dining-room and parlor, which, as well as study, has an open fireplace, with jambs and hearth of tile and mantel of oak. Pantry has dresser, shelves, and sink. Kitchen is provided with portable range set on soapstone hearth, dresser, boiler, etc. Laundry has soapstone wash trays. Servants' closet opens on the side stoop. Second floor is divided into five bedrooms, with generous closet accommodations; bath, with steel-clad tub, oval basin, etc., all supplied directly from the tank located on third floor, together with three good sized bedrooms and storage space. All rooms are finished in clear, yellow poplar, dull finish; staircase of oak. Two furnaces of best make are located in cellar (cemented), with very ample heat flues and registers throughout the house. A marked feature of the design is the absence of any back building or apparent kitchen annex, it being especially intended to eliminate this feature. The construction of the house guarantees warmth in winter and coolness in summer, owing to the non-conductive character of the walls. The building complete cost $6,500. J. C. Worthington, architect, Philadelphia, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT GREENWICH, CONN.

We publish on page 12 "Ridgecrest," one of the most picturesque country houses of the modern rustic style, which has been recently completed for Nelson Mead, Esq., at Belle Haven, Greenwich, Conn. The underpinning and first story are built of huge boulders, taken from old stone walls and placed in position carefully, so as not to disturb the growth of moss upon same. The second and third stories are built of wood, sheathed and then covered with shingles, and left to weather finish. The roof is also shingled. Dimensions: Front, 35 ft.; side, 70 ft., including front piazza, but exclusive of porte-cochère. Height of ceilings: Cellar, 8 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior arrangement is unique and complete. A very desirable feature shown by this plan is that the piazza is separate from the entrance porch and porte-cochère. The grand hall is trimmed with quartered oak. It has a heavily beamed ceiling, forming deep panels, a fireplace built of brick, with hearth of glazed tiles and mantel of oak, and a broad, low staircase, with carved newel posts and a paneled divan. The parlor is treated with ivory white in a delicate manner. The mantel is of an exquisite design. Library and parlor are connected by sliding doors, and it is trimmed with birch. It contains also a fireplace built of brick, with tiled hearth and wood shelf. Dining-room is trimmed with antique oak and is provided with an open fireplace. The floors in these apartments and elsewhere are laid with yellow pine in narrow widths. The butler's closet is well fitted up with bowl, drawers, dresser and store closet. The kitchen is trimmed and wainscoted with yellow pine and is furnished complete. The second floor is trimmed with white pine and treated in colors. This floor contains five bedrooms, two dressing-rooms, seven closets and bathroom. The bathroom is wainscoted and provided with the usual fixtures, with exposed plumbing in the best improved manner. The third floor contains two bedrooms and ample storage. Cemented cellar contains furnace, laundry and necessary apartments. Messrs. Alfred H. Thorp & Wilbur S. Knowles, architects, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

NONSUCH PALACE.*

Of all the suburban palaces of our English sovereigns none has left behind it such a reputation for luxury and magnificence as Nonsuch. Leland says of it:

"Hanc quia non habent similem laudare Britanni
Sæpe solent nullique parem cognomine dicunt."

"Unrivaled in design, the Britons tell
The wondrous praises of this nonpareil."

Not one stone of this splendid palace now exists, and its very site can only with difficulty be traced; but fortunately we have two fairly good views of it. The first is an engraving by Hofnagle, dated 1582, and published in George Brown's "Urbium Præcipuarum Mundi Theatrum," and the other is a much smaller, but I think more valuable engraving by Jodoc Hondius, dated 1610, in "Speede's Surrey." Both of these views represent a kind of elevation of the garden front of the house, with the outer court, in rather singular perspective, showing over it. Hofnagle's view only shows the upper part of the building, the lower portion and the interesting gardens being concealed by a high garden wall; but in Hondius' view this wall is omitted, so as to show the whole building and the garden with its very curious fountains and other structures.

Both of these views are more or less impossible and purely conventional in treatment; but with the help of the various descriptions remaining of the building, more especially the survey made by Cromwell's commissions in 1650, one is able to realize what this royal palace was like in its palmy days.

As Nonsuch was only commenced in the eighteenth year of the reign of Henry VIII. (1527), and was totally destroyed by order of the Commonwealth in 1650, it cannot, of course, have taken a very important position as a historical edifice.

Henry VIII. does not seem to have completed it, as it was purchased in an unfinished condition by the Earl of Arundel in Queen Mary's days. Henry, Earl of Arundel, is said to have spared no expense in completing the house and gardens. It seems to have passed again into the hands of the crown in Elizabeth's time.

The palace seems, somehow or another, to have passed into the hands of Lord Lumley, son-in-law to Lord Henry Arundel, but it was again sold to the crown in 1591. The last royal person who inhabited it was Henrietta Maria, Queen of Charles I. In the survey taken by the commissioners in 1650 it is described as "late percell of the possessions and joynture lands of Henrietta Maria the relict, and late wife, of Charles Stuart, King of England."

Nonsuch Palace was situated near Cheam, in a village called Cuddington, which village, together with its church and manor house, would appear to have been destroyed to make way for the palace with its park and gardens.

The buildings surrounded two courtyards. The outer or lower court measured internally 150 ft. by 132 ft., and the inner or upper court was 137 ft. by 116 ft. The "outer court" was upon a lower level than the "inner court," and there was a rise of eight steps from one to the other. Between the two stood a gate constructed of freestone, three stories high, with embattled turrets at the angles, and crowned by a lead-covered tower to hold the clock, which clock and tower are said to have been "of most excellent workmanship and a special ornament to Nonsuch." There was a little court to the east which contained the kitchens and other offices. The larger or outer court was two stories high, embattled, and constructed entirely of freestone. It contained the lodgings of the almoner, chamberlain and other attendants upon the queen, and also the buttery, wine cellar, etc.

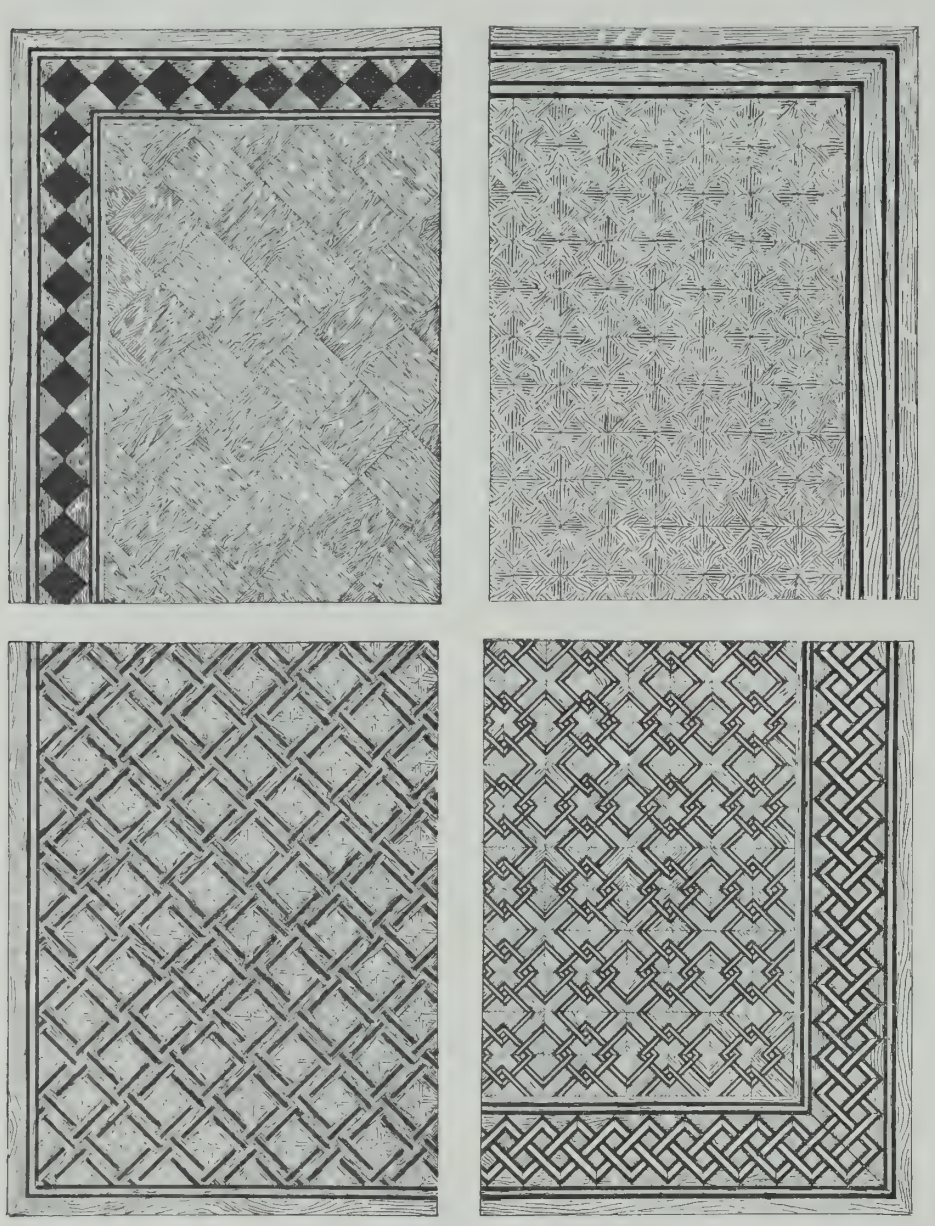
(To be Continued.)

*From the *Builder*, London.

DESIGN FOR A STAIRWAY.

THE PASSING OF THE CARPET.

"The texture of the ordinary carpet is so thick, and its surface so nappy, that it is wholly unfit for a covering to a floor; in fact, it forms a nidus, or bed, for the reception of filth as well as the rapid propagation of disease germs. Not only so, the under floor itself, which ought to receive a frequent cleansing, cannot have this if its surface is carpeted." This statement was made by the eminent physician and writer, Susanna W. Dodds, M.D.



"THE PASSING OF THE CARPET."

For the above reasons, if for no others, most housewives are inclined to either have hardwood floors put down, finished with wax, and with small rugs placed here and there, or the floor is finished in this manner at the sides, in the way of a border from 18 inches to 36 inches wide, and a large rug placed in the centre of the room, or there may be a combination of rugs and mats, varying in size. It is no longer "the fashion" to cover the entire room with a thick, heavy carpet, which looks warm and uncomfortable in summer, and is dusty and dirty all the year, even when kept with reasonable care. Where the floors are carpeted, somebody must give them a thorough sweeping at least once a week, and also breathe the dust that invariably flies into the air. This covers everything, and has to be brushed off, then there is more dust, and a good part of it settles on the floor and everywhere on the walls.

In foreign countries, rugs are generally adopted, in connection with polished hardwood floors, and the methods there employed are such as to provide in the floors and loose coverings material that will last through generations. The floors are of hardwood, polished with wax or shellac, the keeping in order being less work than sweeping, and the repeated polishing preserves and improves the surface, while the woods richen in color and effect; especially is this true of oak and mahogany. The treatment of woods before being made into floors is a very important feature, as a perfect floor is not affected by the dry heat to which it is subjected in houses heated by hot air furnaces and fireplaces.

In this country polished hardwood floors have been gaining in favor steadily. Dining rooms, halls and sleeping rooms are especially to be recommended for this method. It is considered that finer effects can be gained by having handsome oak, in its natural color, polished to bring out its beauty as a background for rugs, than by any dull background such as carpets afford; then, too, the cleanly appearance that these floors impart is desirable. No dust can accumulate, as it is removed with a moist cloth. There are no cracks or crevices, as in the under floor, to catch and hold the deposit of each season.

A parquet floor is an inlaid wood floor, composed of one or more woods, in varying shades and colors, made into a geometrical or other design. A floor laid in plain straight lines cannot be called a design. This material is made into block or slabs, from 12 in. square to 24 in. x 48 in. in size, for fields or centres, according to the pattern and thickness, and for borders in lengths of 12 feet. The floors are made $\frac{5}{16}$, $\frac{7}{8}$ or $1\frac{1}{4}$ inches thick. They can be laid on old floors as well as new.

In the construction of a new house these thinner floors do not interfere with the specifications in any way.

They are laid on the under floors in such a manner as to strengthen them. They are made plain or ornamental to suit the taste. Some of the finest effects are produced by oak alone, the figures being the effect produced by changing the direction of the grain in the perfectly made joints.

A choice wood for floors is the white oak of Indiana, the grain of which is very fine and close; it has not the open pores that are found in the oak of other districts. This quality makes it of especial value in connection with its fine figure when quarter sawed. The Interior Hardwood Co., of Indianapolis, Indiana, are manufacturers of plain and parquet floors. They make a specialty of the choice Indiana oak, in combination with the foreign and domestic hardwoods, shipping their material to every State in the Union. The floors are made to cover each room, and sent with working drawings to show how they are to be laid. Any good carpenter can follow their directions and lay and finish the material.

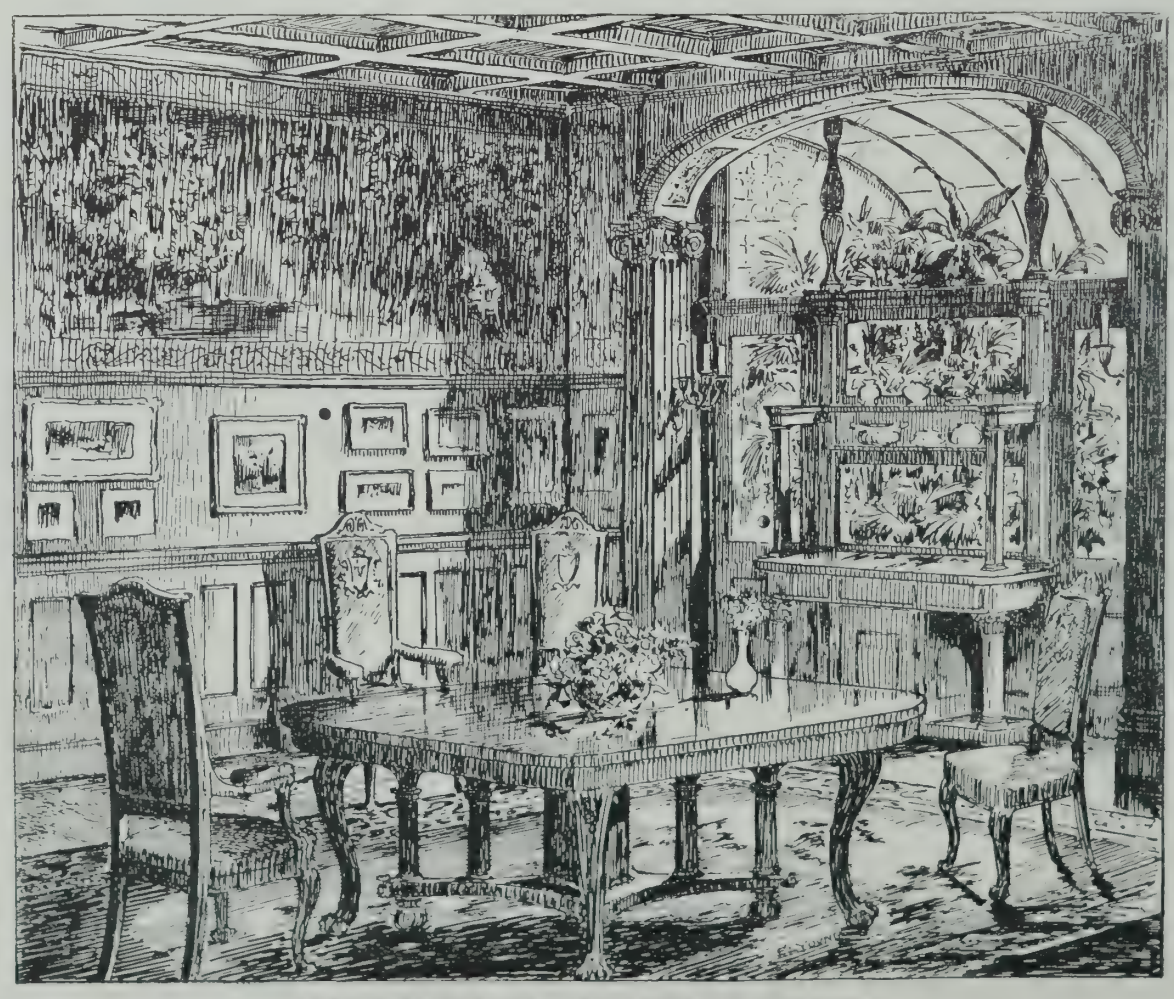
WHY NOT REMODEL THE OLD HOME?

Modernize it, and introduce a few conveniences to the interior, removing objectionable inconveniences, and in their place substituting interior woodwork, fittings and furnishings.

Among some of the improvements, for instance, would be a sliding door, to replace an old swinging one; a new staircase that would widen the hall, mantels that would be appropriate for each room, and many other things which the shape and size of the house would suggest. Among designers and furnishers who may well be consulted in such work are the celebrated steamship and car builders, the Harlan & Hollingsworth Company, of Wilmington, Del., who have their offices in London, New York, Chicago, Philadelphia, and Washington, D. C. They create artistic interiors, and, from the experience of years in utilizing space to the utmost, the development of a department devoted to the remodeling of house interiors is the natural result of the growth and progress of the business of that company. The scope of this department also includes the interior hardwood finishing of office buildings, hotels and residences.

The accompanying sketch illustrates a remodeled interior of a dining-room in an old city house, which was the usual commonplace room, with two windows opening on a rear yard, the light subdued by long, heavy curtains until very little daylight ever entered into the room. To accomplish this improvement, the centre brick pier between the windows was removed, and across the opening thus made, overlapping the jambs of the windows, a steel girder was placed, which carried the brick walls overhead. A conservatory, constructed of galvanized iron sash bars, angle iron purlins, properly braced with struts and tension rods and turnbuckles, with ventilators and the apparatus to work them, was put up as shown. Between the partition of the conservatory and the wall of house, a space sufficiently wide to admit the swing of a door has been utilized overhead to ventilate the dining-room to the outside air. The light obtained through this improvement is very valuable, and can be subdued by linen shades on the glass partition. The sideboard, as will be seen, is placed between the entrances to the conservatory, where it occupies no valuable room. Instead of using mirrors to reflect the room, which is the usual way of decorating a sideboard, the spaces are left open and filled with clear plate glass, and living flower pictures are thus obtained. The woodwork of the room, which is dark oak, consists of a high wainscot, divided into two sections horizontally, the lower part paneled, the upper part flush. Upon this latter portion of the wainscot the pictures are hung, as upon a background. The ceiling is paneled with beams of solid oak, with heavy oak flush panels between. The columns and capitals, together with the arches, spandrels and carved soffits, incase the old brickwork, and make a finish to the woodwork. The polishing and rubbing down of the woodwork is a matter of course. The decoration of the walls above the wainscot consists of tapestry hangings, which fill the space, and so tone into the woodwork as to make the walls successful backgrounds for paintings, bric-à-brac, and such little touches of color here and there as a woman gives to her home.

The company proposes to show designs such as this, or in color, to illustrate the many ways of remodeling old houses, making designs for the client until the style, finish, convenience and price accord with his ideas and are consistent with the building.



REMODELED INTERIOR, DINING-ROOM, OLD CITY HOUSE.

ADETACHABLE WATER-CLOSET SEAT.

The well-known firm of Haines, Jones & Cadbury Co., of Philadelphia, have recently devised a most unique and valuable water-closet seat attachment known as the "Albo" detachable seat. As shown in the accompanying illustration, the earthenware bowl is made with two small oval holes at the back of the closet, which extend down into the earthenware about one inch. These holes are made larger at the bottom than at the top. Into them are placed brass trunnions, fitted with special springs. When the trunnions are placed in the closet, the springs expand, and the seat is held firmly and securely in place. The construction of this seat is very simple, and it will not get out of order. It gives promise of being the most popular seat ever offered to the trade. With the "Albo" detachable seat they not only do away with the unnecessary dirt-absorbing wōodwork at back of closet, but also present a seat in every way a perfect sanitary success. The "Aibo" allows of an "all open" space at the back between closet and wall, thus giving free access around the bowl at all times. The "Albo" seat is also detachable. By simply putting the seat in a vertical position at right angles to the earthenware, and gently lifting, the seat can be detached, and you are free to wash all parts of the

A DETACHABLE WATER-CLOSET SEAT.

closet without any hindrance whatever. This is a very valuable feature. When closets are placed in marble or slate stalls, the seat can be detached, and washed from a hose turned on a closet without fear of damaging its woodwork.

MOTT'S "SUNRAY" STEAM BOILER.

The accompanying cut illustrates a new steam heater just placed on the market by the J. L. Mott Iron Works, Beekman Street, New York. The heater is designed for small residence work, and for furnishing steam for coffee-rooms, steam-kettles, carving-tables, or any other purpose requiring a moderate supply of steam at a low pressure.

It is claimed t' at technical tests of this heater show a

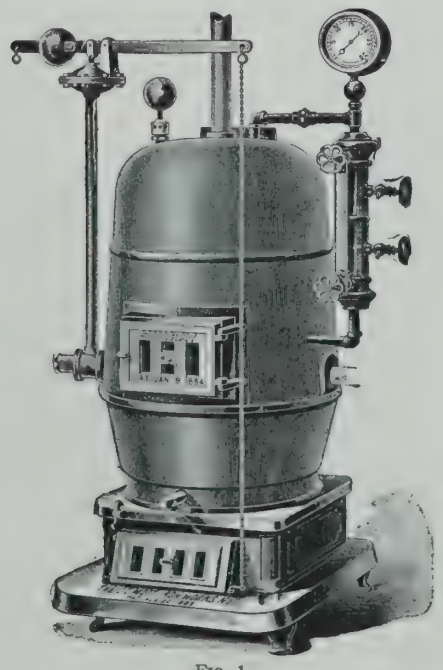


FIG. 1.

very high rate of economy and efficiency. It has an ample fire-chamber, and the heating surface is brought in direct contact with the fire, thus making a quick and powerful steamer. Figure 1 gives the external appearance of the heater, and Figure 2 is a sectional cut showing arrangement of fire-surfaces, water-line and steam-chamber.

It will be seen from the illustrations that no steam or

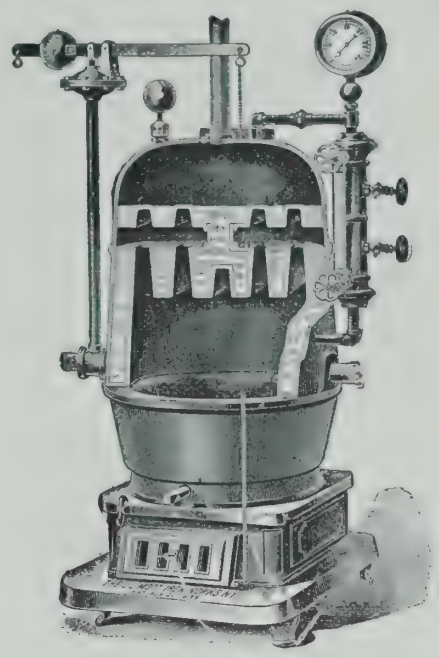


FIG. 2.

water joints are left for the fitter to make, as the generating part of the heater is all put together before shipment; also, that no packed or washer joints are used in its construction. It is easily handled and can be taken in at any ordinary door or window. It is claimed by the makers that this heater can be set up ready for piping in one-half hour after it has been unloaded at the building.

This heater is made in five sizes, capable of supplying from 150 to 400 square feet of heating surface, or the equivalent in any other service it may be used for.

Modern Brick Machinery.

One of the latest improvements in brick machinery has recently been placed on the market by the Henry Martin Brick Machine Manufacturing Company, Lancaster, Penn., manufacturers and exporters of the famous "Henry Martin" brick making machinery. Their invention consists of a simple machine for removing stones, roots and foreign matter from clays that are useless on this account, and preparing the clay for making some of the most substantial and perfect brick, some of the best tenacious clay being found among the worst beds of stone.

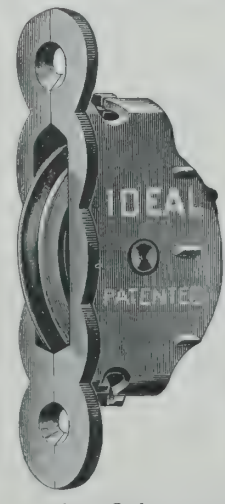
This invention has proven itself to be an important one in the line of brick manufacturing machinery, the machine being simple, strong, and very durable, at the same time doing its work perfectly.

THE STANDARD VARNISH WORKS, New York, and with a store also in London, England, have recently completed and now occupy a large warehouse in Dearborn Street, Chicago, the building occupying a ground space of 72 by 90 feet. It is fitted with all modern improvements, and supplied with facilities for the rapid handling of goods.

MESSRS. A NORTHROP & CO., of Pittsburg, Pa., have recently completed some considerable contracts for their patent metallic ceilings, and have on hand a $2,300 contract in church ceilings and walls for St. Wenceslaus' Church, Spillville, Iowa. Their deep stamped panels make a rich appearance, and they make up handsome special designs, with mouldings to bring the designs into relief.

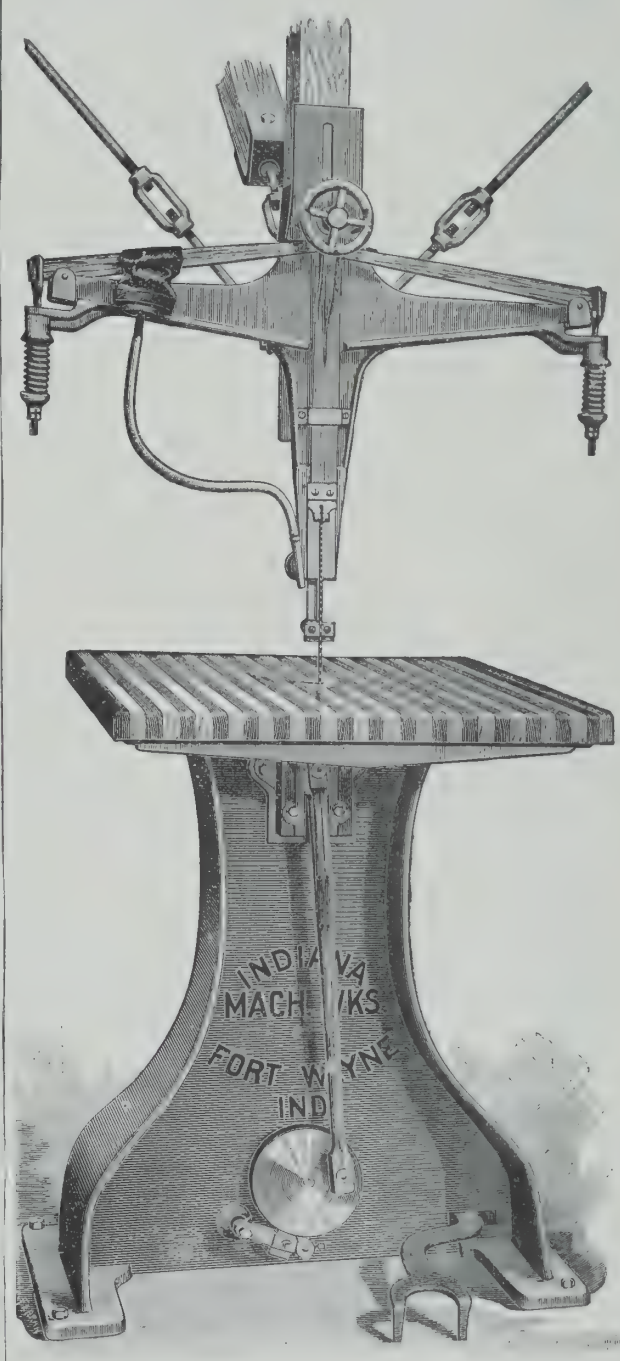
THE "IDEAL" SASH PULLEY.

The cut shows a new form of the Ideal patented sash pulley, adapted for auger mortise, and arranged with corrugated face plate and markers. The pulley is made by the Stover Manufacturing Co., of Freeport, Ill., who claim for it all the essential features embodied in other forms of Ideal pulleys, viz.: cone axles, true wheels, noiseless running, and the novel method of joining body and wheel in one. The face plate has scalloped sides and round ends, arranged to fit a mortise made with a one inch auger, which may be operated by hand or machinery, as desired. Markers are arranged on the side of pulley for marking the centres to bore the holes by, thus simplifying the process of applying, and insuring a perfect fit in every case. The manufacturers offer to furnish free sample and quote prices on application.



IMPROVED WOODWORKING MACHINERY.

The accompanying illustration represents a new machine for scroll or internal sawing in planing mills, sash, door and blind factories, furniture, coffin, wagon and buggy shops; in fact, most any woodworking industry, making brackets or work of similar character. The frame is heavy, thoroughly braced, has wide floor support, with an extension to carry outside bearing for shaft, and is made in one piece. Table is very substantially supported, made of strips of hardwood glued together, and measures 32x34 inches. The shaft and crosshead are made of hammered steel, the former running in long bearings with best Babbitt, while the latter slides in brass ways with oil chambers. Both are provided with best facilities for oiling and for taking up all wear. Crank wheel is perfectly balanced, and its wrist pin made of steel. Pitman is made of second growth hickory, made light but peculiarly strong, all of which cause the machine to run without jar under high speed. By the aid of belt shifter and brake, machine may be instantly stopped. The adjustable strain is very simple, consisting of two spiral springs and levers, to which saw strap is attached. Provisions are made to increase or decrease the tension on blade, and a blower furnished to remove the dust, so that trace lines (on



A NEW SCROLL SAW OF THE INDIANA MACHINE WORKS.

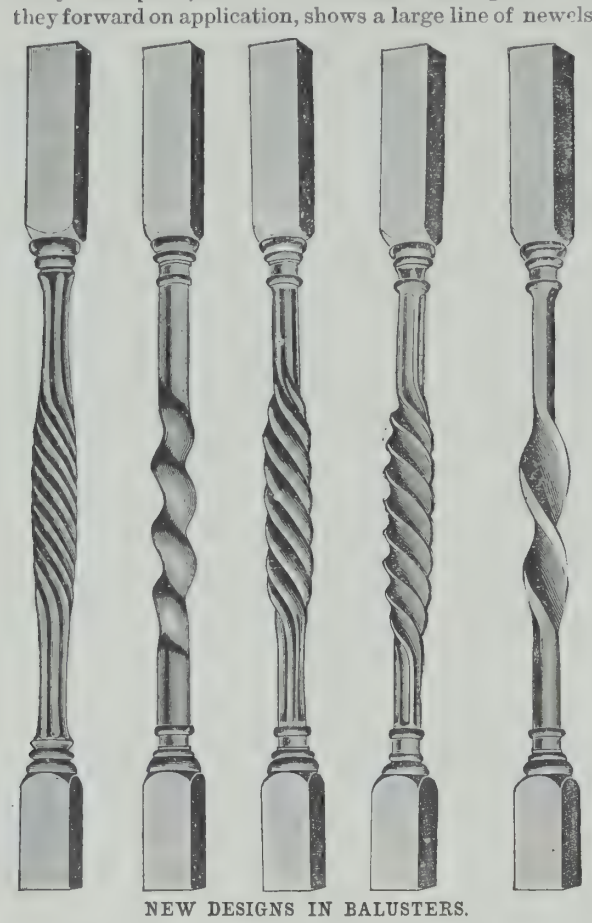
the work before the operator) are always visible. The machine is made by the Indiana Machine Works, Fort Wayne, Indiana.

Eighteen Elevators for the New Commercial Building, Philadelphia.

Such a number of elevators to be placed in one building is anything but an ordinary occurrence. Only a few years ago it would have been exceptional for a building to have more than one elevator; but with the raising of buildings to such heights as they are at present, it is necessary to build what might be termed "vertical streets." The builders of the new Commercial building in Philadelphia received estimates and inquired into the safety, speed, and economy of all the first-class elevators manufactured in this country, and finally awarded the contract to the Graves Elevator Company, of Rochester, New York. This contract was awarded after an exhaustive and competitive investigation. The Graves Elevator Company have also just been awarded the contract for two of their high speed hydraulic passenger elevators for the new Tremont Temple, Boston, Mass.

ARCHITECTURAL WOOD TURNING.

We show herewith several new designs in balusters that Adam Dickey & Co., 43 Bristol Street, Boston, have recently placed on the market. This firm makes a specialty of architectural wood turning and mouldings of every description, and their illustrated catalogue, which they forward on application, shows a large line of newels,

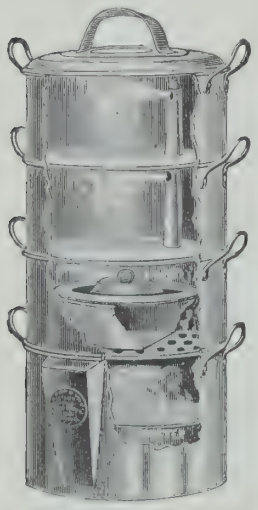


NEW DESIGNS IN BALUSTERS.

balusters, rails, columns, etc. Their special patented machinery enables them to promptly furnish work to order as architects and builders may desire. They make a specialty of stair building, piazza columns and balustrades, and have a very large number of designs in stock.

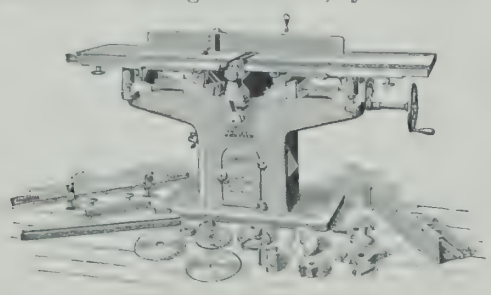
THE BEVERIDGE COOKER.

This simple device received a high award at the recent World's Columbian Exposition, as a household invention of great merit. It can be used on any kind of stove where the heat is sufficient to boil the water in the lower vessel, the steam generated being passed up into each compartment by a vertical steam pipe, and the food in each compartment being cooked entirely by the steam. It is a simple and convenient method of cooking. It is a well-known scientific fact that food cooked by steam is more savory, juicy and nourishing than by any other process. Food cooked in this cooker retains its entire flavor and nutritious qualities. It confines the odor of cooking to the kitchen. It occupies little room. You can cook from one to four different articles at the same time, in compartments one above the other. The food is cooked as well and as thorough in the top compartment as in the lower one. It can be used upon and fits any kind of stove—coal, wood, coal-oil, gas or gasoline. This cooker is manufactured by W. E. Beveridge, No. 305 South Sharp Street, Baltimore, Md.



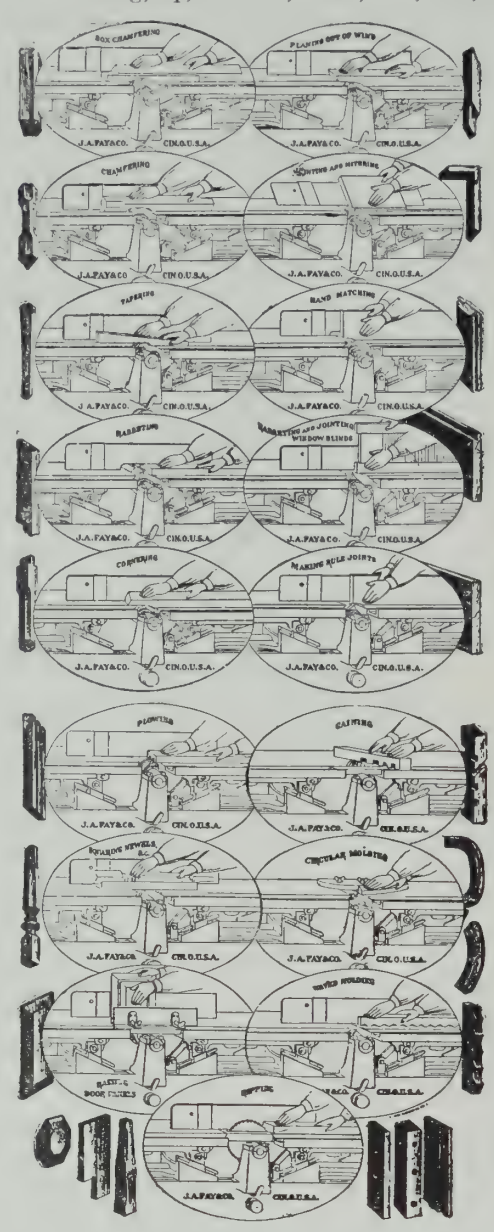
A VARIETY WOODWORKER.

The machine herewith illustrated combines the functions of the horizontal surface dressing ordinarily used in hand planing and variety woodworking machines, and a vertical surface dressing attachment, by which two surfaces can be operated upon at the same time in squaring up. It will plane out of wind, surface straight or tapering, rabbet door frames, etc., rabbet and face inside blinds, joint, bevel, gain, chamfer, plow, make glue joints, square up bedposts, table legs, newels, etc., raise



A VARIETY WOODWORKER.

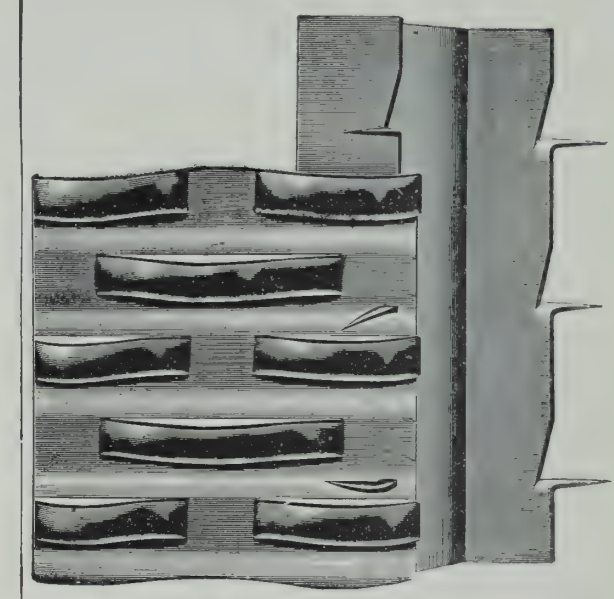
panels, either square, bevel, or ogee, stick beads, work circular moulding, rip, cross-cut, tenon, bore, rout, rabbet



and edge door frames, rabbet, joint and bead window blinds, work edge moulding, etc. The tables are made of iron, each 40 x 19½ inches, planed perfectly true, and have independent vertical and lateral adjustments, by means of the hand wheel at the working end of the machine. When facing for taking out of wind, the vertical and lateral adjustments can be made simultaneously, thus constantly retaining the proper distance between periphery of cut and edge of table. All the different functions of the machine are secured by the use of two tables, thereby effecting a saving of time in making the adjustments. The tables are made with grooves to receive the gaining frame, and are made continuous by filling pieces connected with them when so used. For sawing, a short supplemental table is inserted between the other two, making a continuous saw table. The horizontal arbor is of steel, 1 7-16 inches diameter. The vertical arbor is of steel, 1 7-16 inches diameter, and arranged to be dropped below the line of the table, by removal of the head and operating a screw which supports the vertical spindle frame. In the accompanying cuts are shown some of the positions of the tables, which give to the reader an idea of the capacity of the machine. For further information address the makers and introducers, J. A. Fay & Co., Nos. 209–229 West Front Street, Cincinnati, Ohio, U. S. A.

THE "MONARCH" FIREPROOF PARTITION.

The Turnbull & Cullerton Steel Lath Co., of Chicago, manufacture this partition, and present it as the strongest, cheapest, and best, answering all requirements of a fireproof and soundproof interior dividing wall. It is built on steel grooves, designed to afford the greatest angular strength possible, and is securely held in position by adjustable wrought iron foot and head plates. All openings are provided with a special iron head, having brackets which interlock with the partition grooves, and make a framework of sufficient strength to carry the door without springing the partition or breaking the plaster. A false



Iron Stanchions and Fasteners, and Fireproof Steel Lath.

Foot Holder for Uprights in Partition.
TURNBULL & CULLERTON'S FIREPROOF PARTITION.

jamb is then secured to this iron framework by means of wrought staples, to which the door jambs may be easily attached. The surface of both sides of the wall thus erected is then covered with sheet metal lath, being anchored with staples cut on the flanges of the upright grooves, which are driven through the lath and clinched down on the outside, holding it straight and solid. The partition is then plastered the same as an ordinary wall. This partition is only 2½ inches thick when plastered, and weighs only about one-quarter as much as ordinary fireproof partitions.

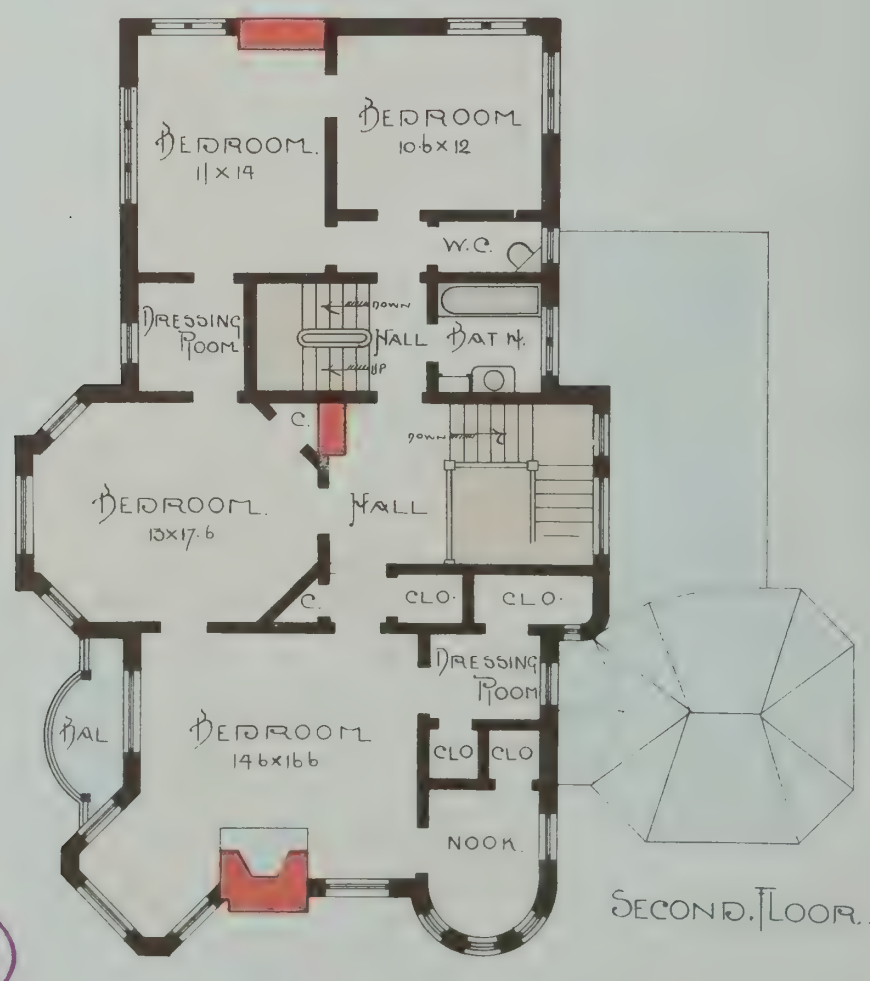
THE HOTEL PHŒNIX, WINSTON, N. C.

The accompanying illustration is from a photograph of the new Hotel Phœnix, at Winston, N. C., on which the Roanoke Roofing and Metal Cornice Company, of Roanoke, Va., performed all the work in their line, namely, copper belt course, galvanized iron cornices and bay window coverings, tin roof and slate on tower, mansard and dormer windows. Among other things, the company makes rock-faced metal plates for building fronts, metal ceilings, skylights.

THE HOTEL PHŒNIX, WINSTON, N. C.

A RESIDENCE AT PLAINFIELD, N.J.

FIRST. FLOOR.



SECOND. FLOOR.

A RESIDENCE AT EDGEWATER, ILL.

SCHUMACHER & ETTLINGER, NEW YORK

SCIENTIFIC AMERICAN

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A RESIDENCE AT EDGEWATER, ILL.—See page 18.

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THE

Scientific American,

ARCHITECTS AND BUILDERS EDITION.

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CONTENTS

Of the August number of the ARCHITECTS AND BUILDERS EDITION of SCIENTIFIC AMERICAN.

(Illustrated articles are marked with an asterisk.)

A RESIDENCE AT PLAINFIELD, N. J.

As the subject for one of our plates in colors, we present in this issue a residence recently completed for George H. Babcock, Esq., of Plainfield, New Jersey. An additional view is given on page 19. The design is treated in a very odd and picturesque manner. The exterior walls, from foundation to peak, are built of selected burned brick, and accidents of terra cotta and Philadelphia pressed brick, laid up at random, without regard to uniformity and with noses protruding. The roof is covered with a combination of the Celadon Terra Cotta Company's Rhinoceros and Gothic tiling. Dimensions: Front, 35 ft.; side, 55 ft., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior arrangement is complete and most excellent. The reception hall and lobby are trimmed with oak. It contains an ornamental staircase, with carved newel posts, and a paneled seat on first landing. This staircase is lighted effectively by windows glazed with stained glass. The hall also contains an open fireplace, with a tiled hearth and facings, and a hardwood mantel, with mirror and columns. Parlor and den are trimmed with birch, the former having an open fireplace, while the latter contains a paneled divan and bookcases built in, with drawers and shelves inclosed by leaded glass doors. Dining-room is trimmed with oak. It has a buffet built in, and is connected by double sliding doors. The floors are laid with maple in narrow widths. Kitchen, rear hall, and pantries are trimmed and wainscoted with Georgia pine. The apartments are furnished with the usual fixtures replete. The second floor is trimmed with white pine, and finished natural. This floor contains four bedrooms, six closets, nook, two dressing-rooms, and bathroom, the latter wainscoted and fitted up complete. The rear hall and stairway are private to third floor, which contains a studio extending across the front of the building, two bedrooms, and ample storage. Cemented cellar contains laundry, furnace, and other necessary apartments. Mr. E. L. Hyde, architect, 130 Liberty Street, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT HACKENSACK, N. J.

The engravings and floor plans presented herewith in this issue illustrate a residence recently completed for J. P. Clarendon, Esq., at Hackensack, New Jersey.

The main lines of the building are square, but they are sufficiently broken by a broad, spacious and well shaded piazza, bay windows, Dutch chimney, and circular bay at corner rising up two stories, with outlook and tower above at third story. The underpinning is built of rock-faced stone and local brick, laid up in red mortar. The exterior framework is sheathed, papered, and then covered with clapboarding and shingles. The clapboarding is painted a reddish brown, with darker trimmings, and the shingles are oiled and left to finish mahogany color. The roof is shingled and left to weather finish. Dimensions: Front, 37 ft.; side, 34 ft., not including piazza and bay windows. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. Lobby has a paneled wainscoting and a hardwood floor. Hall is trimmed with quartered oak. It contains an ornamental staircase, with carved newel posts. Parlor is treated in a delicate manner, with ivory white and gold. It has an open fireplace, furnished with white onyx tiling, brass trimmings, and a dainty mantel, with columns and mirror. Library and dining-room are finished in oak, and they have open fireplaces, trimmed with tiles and provided with oak mantels. Butler's pantry and kitchen are wainscoted and trimmed with Georgia pine, finished natural, and these apartments are fitted up with all the necessary fixtures complete. The second and third floors are trimmed with whitewood and finished natural. Second floor contains four bedrooms, eight closets, dressing and bath room, and third floor contains one bedroom and ample storage. Bathroom is wainscoted with oak, and is furnished replete. Cemented cellar contains furnace, laundry and other necessary apartments. Rear stairway is private from cellar to third floor. Mr. J. E. Terhune, architect, Hackensack, New Jersey.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT ERIE, PA.

On page 21 we illustrate a dwelling erected for William J. Sell, situated corner of Lakeside Park and Peach Street. The underpinning is of rock-faced stone, light gray color. First and second stories are clapboarded. Gables shingled, and stained moss green. Roof slated. House painted Colonial yellow in color, trimmed with a dark yellow. Dimensions: Front, 31 ft.; side, 50 ft., not including veranda, which is 8 ft. deep. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second story, 9 ft. Plate glass windows in the front part of the house. The vestibule, reception hall, parlor and dining-room are finished in quartered oak, the former having an oak floor. The reception hall contains an ornamental oak staircase, with a broad, low rise, carved newels, and is paneled under the stairs on the partition of the hall closet. It is lighted effectively by a cluster of stained glass windows, up stairs and down. The parlor and dining-room have open fireplaces, furnished with hearth and facings of enameled tiling, and Colonial mantels, with columns and mirrors. Kitchen is wainscoted, and all the woodwork is finished in natural pine. The veranda, bathroom, kitchen, and pantry have hardwood floors. Pantry and china closet are fitted up with drawers and cupboards, and the pantry has a slate countershelf. The woodwork on second floor is finished in natural pine, and it contains sewing-room and three chambers, with ample closets, and bathroom. The first floor bathroom is wainscoted, and provided with a porcelain-lined bathtub, and all the desirable fixtures nickelplated and of the best. Complete arrangements are made for heating the house with coal and fuel gas for both furnace and grates. Cemented cellar, under whole house, has laundry, furnace, and other necessary apartments. The house is lighted by electricity and gas, having combination fixtures. Cost, $4,500, including furnace, mantels, and everything complete ready for occupancy. Mr. C. F. Dean, architect, Erie, Pa.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT EDGEWATER, ILL.

We publish as a subject for one of our colored plates in this issue a residence recently erected for Mrs. Eva L. Prescott, at Edgewater, Illinois. An additional view is given on page 17. The whole treatment of the building is most excellent, and the perspectives present an artistic and picturesque design. The floor plans accompanying these perspective views show an interior arrangement which cannot be surpassed in its economic use of space and convenience. Some of the features worthy of mention are the bay windows, front and side porches, and outlook. The underpinning, which extends up to the first story window sills, and chimneys, are built of rock-faced stone of a greenish-gray color. The superstructure above is built of wood, and the exterior framework is covered with clapboarding to second story window sills. The framework above this is covered with plaster plates, and then coated with a brown mortar composition. The whole building is treated in a reddish brown color. The roof is shingled and painted red. Dimensions: Front, 38 ft. 2 in.; side, 39 ft. 8 in., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The vestibule is trimmed with oak, and it has a paneled wainscoting and an oak floor. Hall is trimmed with similar wood, and it contains a broad, low staircase, with carved newels. The floor is laid with oak. The reception room is trimmed with white pine, and is treated in ivory white and gold. Parlor is trimmed with birch, and dining-room with oak; the former is provided with an open fireplace, furnished with tiles and a hardwood mantel, and the latter is provided with a hardwood floor. The windows opening out upon side porch extend to floor. Butler's closet and pantry are fitted up with drawers, shelves and cupboards complete. The kitchen is trimmed and wainscoted with white pine, finished natural, and it is floored with maple laid in narrow widths. The second floor is trimmed throughout with white pine. The floors are laid with similar wood, with the exception of the floor in hall, which is laid with oak. This floor contains four bedrooms, six closets and bathroom. The closets are fitted up with shelves, drawers, and wardrobe hooks. Bathroom is wainscoted with oak and fitted up with the usual fixtures complete; exposed nickelplated plumbing. The third floor contains three bedrooms and trunk room. Cemented cellar contains furnace, laundry and other necessary apartments. Mr. J. L. Silsbee, architect, 52 Lakeside Building, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT BELLE HAVEN, CONN.

On pages 24, 25, 26, we illustrate a beautiful residence recently erected at Belle Haven, Conn., from plans prepared by Mr. C. P. H. Gilbert, architect, 18 Broadway, New York City. The design presents a most perfect example for a country residence, and one of the special features is the broad, spacious and well shaded piazza. The porte-cochère, balcony and towers are also good features. The whole treatment is of the Colonial style, and the interior is designed in the Classic order, a very healthy style of architecture to which the professional mind of to-day is now turning. The underpinning is built of rock-faced local bluestone, laid up in black mortar. The exterior framework is sheathed and then covered with shingles. The roof is also shingled, and the whole is left to weather finish. Dimensions: Front, 70 ft.; side, 64 ft., exclusive of piazza and porte cochère. Height of ceilings: Cellar, 8 ft; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The interior arrangement is most complete and the plans show many large rooms, that are handsomely trimmed with whitewood and treated in china white throughout. The halls, parlor, billiard and dining rooms are connected, and each has paneled wainscotings and heavy moulded cornices. Hall contains a very handsome staircase, with spindle balusters and mahogany rail. It is provided with a bay window, and seat thrown out at second landing. This staircase is lighted by stained glass windows. The reception hall is provided with a paneled divan, and an open fireplace, built of Tiffany brick, with facings of same, and a mantelshelf with mirror. Parlor is treated in a unique manner. The billiard-room is separated from hall by archways supported on Ionic columns, forming an arcaded effect. This former room contains a fireplace, furnished complete. Dining-room is provided with a similar fireplace, and it also has a circular bay-window at corner. Kitchen and pantries are trimmed and wainscoted with whitewood, finished natural, and these apartments are furnished with the usual fixtures complete. The rear hall is a convenience, and, being of ample dimensions, is used as a servants' dining hall. The toilet room is located conveniently. The second floor contains four bedrooms, nine closets and two bathrooms, and the third floor contains four bedrooms and ample storage. Bathrooms are wainscoted with white tiling and provided with exposed plumbing. Cellar is cemented and contains furnace, laundry and other necessary apartments.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT PLAINFIELD, N. J.

RESIDENCE OF E. EINSTEIN, ESQ., POMPTON, N. J.

Our engravings, page 28, illustrate the beautiful residence of E. Einstein, Esq., at Pompton, N. J. The foundation is of brick and field stone, the siding of clapboards, and roofs of shingles. The heating is furnished by two hot-air furnaces of approved make. The front shown in photo looks out over Pompton Lake. Wide and commodious piazzas on three stories. The house has entrances from the front, both sides, and the rear. Servants are distinctly separate from the rest of the house. A back staircase leads from kitchen to third story. All outside roofs, walls, and floors are filled with mineral wool. The plumbing is all open, with polished nickeled pipes. Bathrooms are tiled. Dining-room is separated from kitchen by passage and three doors, thus excluding all doors of cooking. The entrance hall is large, with fine, broad staircase, and landing halfway up to second story, with seat extending across under large window, which runs up two stories, and furnishes a splendid light. Off the hall, on first story, is a nook, with large, open fireplace and seats. This fireplace is built of Roman brick, and furnished with black iron trimmings. The hall and nook are finished in quartered oak, with beams in ceiling, and wainscoting 5 feet high. The kitchen, butler's pantry, and closets are large and conveniently arranged for use. The laundry is under the kitchen, and is well lighted and ventilated, as well as being equipped with all modern improvements. There are six chambers and two bathrooms on second story; each room is furnished with large closet, and made convenient as possible. There are also a large linen closet and slop sink room off rear hall. On third story there are six chambers and servants' bathroom, all finished in Indiana poplar. The second story rooms are finished in enameled woods, and decorated to match trim. The two principal chambers on this floor have open fireplaces. The cellar extends under the entire building, and is partitioned off to suit all requirements. The cost, complete, was about $20,000. Architect, Mr. Manly N. Cutter, 203 Broadway, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE OF GEO. W. PAYNE, CARTHAGE, ILL.

On page 20 we illustrate a conveniently and economically arranged suburban cottage, erected for Geo. W. Payne, Esq., at Carthage, Ill. The view shows an attractive and picturesque exterior. The foundation is built of local stone up to grade, thence an underpinning of brick to floor timbers. The construction is of the most substantial character, and the materials of the best kinds. The exterior walls are sheathed diagonally with pine flooring, covered with paper and clapboards. Roof shingled. Dimensions: Front, 39 ft. 6 in.; side, 47 ft., not including projection of front porch. Height of stories: Cellar under whole, 7 and 8 ft.; first story, 9 ft. 8 in; second story, 8 ft. 6 in. The rooms are well shaped, and proportioned to each other, and a general air of light and cheerfulness pervades the whole house. The building is set well above grade, and is entered from the front by a porch, through a vestibule, into the sitting-room. The octagonal bay in this room is alcoved, and fitted with built in bookcases, altogether making a very cozy reading-room. The general aspect of the room is enlivened by an open grate. To the right is the parlor, and back of this the dining-room. To the rear of the sitting-room is a bedroom, furnished with a rear outlet, and connected with the kitchen and dining-room through a lobby. In the lobby is a dumbwaiter, furnishing convenient connection with the cellar, which is also reached by stairs leading down from the lobby. The pantry is well furnished with all conveniences. The kitchen has a sink, and brick-set range, with water-back and boiler, and communicates with the dining-room through the lobby and china closet. The furnace is located under the dining-room. On the second floor are three chambers and bathroom, and stairs to attic. The entire first floor is laid double. The first story is trimmed throughout with cypress wood, and the second story with white pine, all finished in natural color. Cost $3,000, including furnace and range. Geo. W. Payne & Son, architects, Carthage, Ill

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE OF A. W. O'HARRA, CARTHAGE, ILL.

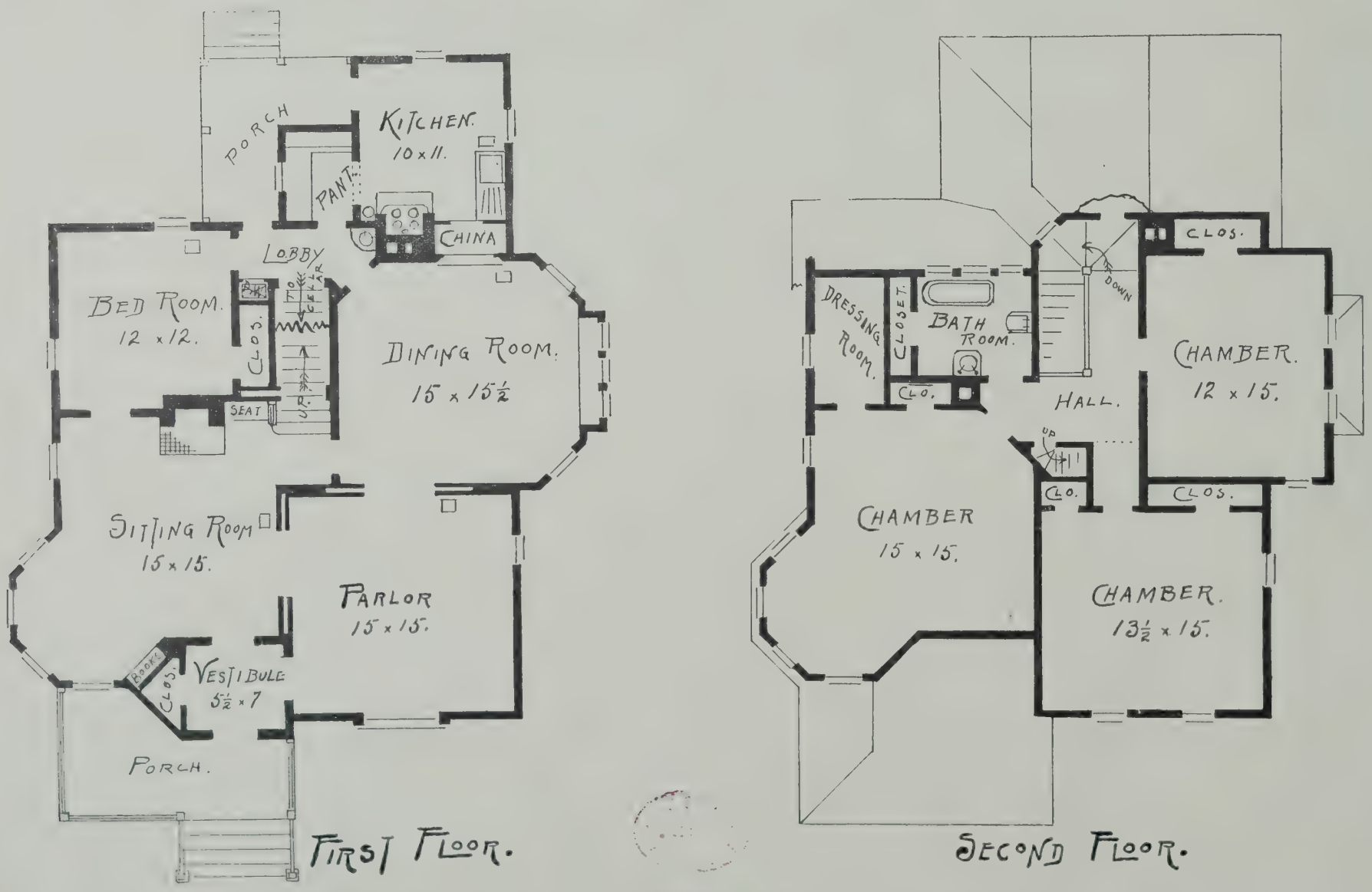
We illustrate on page 22 a well arranged dwelling, recently erected for Mr. A. W. O'Harra, at Carthage, Ill. The exterior appearance of the building is very pleasing. In the first story are the hall, parlor, sitting-room, dining-room and bedroom, so arranged that they can be thrown together. In the rear of these rooms are located a bathroom, lobby, pantries and kitchen. There is a very prettily designed staircase in the hall, of butternut wood. The hall is lighted by ground glass in the front doors, and by three stained glass windows on the upper landing of stairway. On the second floor are five good chambers, besides study, bathroom, halls, closets, and other accessories. The interior trim in the vestibule, hall (including stairway), parlor, bedroom, sitting-room and dining-room, is of butternut wood. All other rooms on the first floor are trimmed in yellow pine, second floor in white pine, all finished natural. The dining-room, kitchen, pantries, bathrooms, are wainscoted three feet high. A fuel lift is provided from the cellar to kitchen. Fireplaces in the parlor and sitting-room are furnished with neat wood mantels. The glass in front windows is of plate. The transoms over large windows in parlor and sitting-room are of stained glass. Constructionally, the house is of the best timbers and workmanship, the two stories being sheathed, papered and clapboarded outside, and the roof shingled with cypress. All floors in the first story are laid double thickness. The entire attic is floored, but left otherwise unfinished. The plumbing is complete, with whispering tubes in the walls where desired, electric lighted, and wired for bells. Heating by furnace in basement; cellar under principal portion of building; painting and finishing of the best materials and workmanship. Dimensions, 49 x 57 ft. 6 in. over all, except projection of front porch. Height of ceilings: Cellar, 7 and 8 ft.; first story, 11 ft.; second, 9 ft. 6 in. Cost complete including foundation, heating, plumbing and mantels $5,500. Geo. W. Payne & Son, architects, Carthage, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

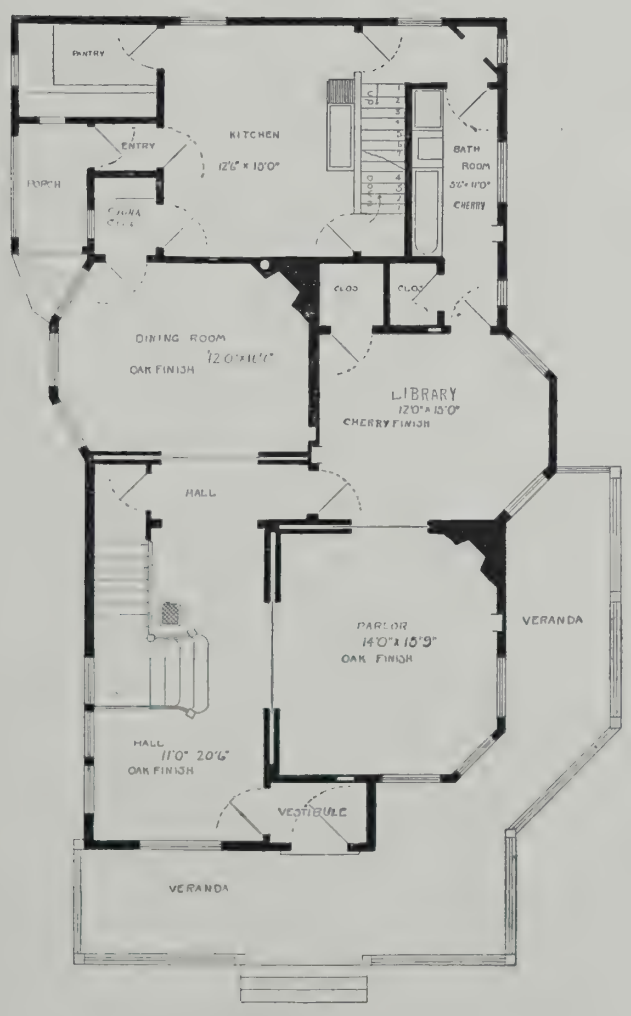
A STABLE AT BELLE HAVEN, CONN.

We publish on page 27 illustrations of a stable recently completed at Belle Haven, Conn. The design is unique, and is in keeping with the residence at same place, which is also presented in this issue, on pages 24, 25, 26. The foundation is built of local stone. The exterior framework is sheathed and covered with shingles, and then left to weather finish. The trimmings are painted white. The roof is also shingled. The main structure is 36 feet wide and 48 feet deep. The plan is excellent, and it shows a large carriage room, and a well lighted and ventilated stable, containing four stalls and box stall, and furnished with the usual ornamental iron fixtures. The floors throughout the interior are laid with yellow pine, and the walls and ceiling are ceiled with similar wood, beaded and finished natural. Stairs lead to the second floor, containing the groom's quarters and hay loft. The groom's quarters consist of one large living room, kitchen, pantries and two bedrooms, fitted up in a good manner. Mr. C. P. H. Gilbert, architect, 18 Broadway, New York.

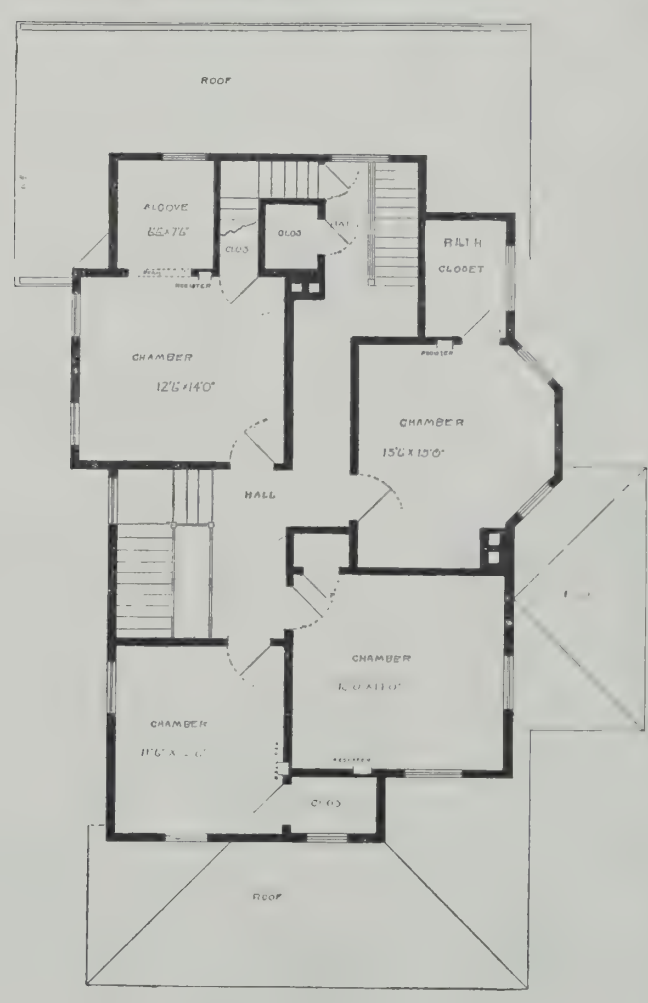
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



RESIDENCE OF GEO. W. PAYNE, CARTHAGE, ILL.—See page 19.



PLAN OF FIRST FLOOR



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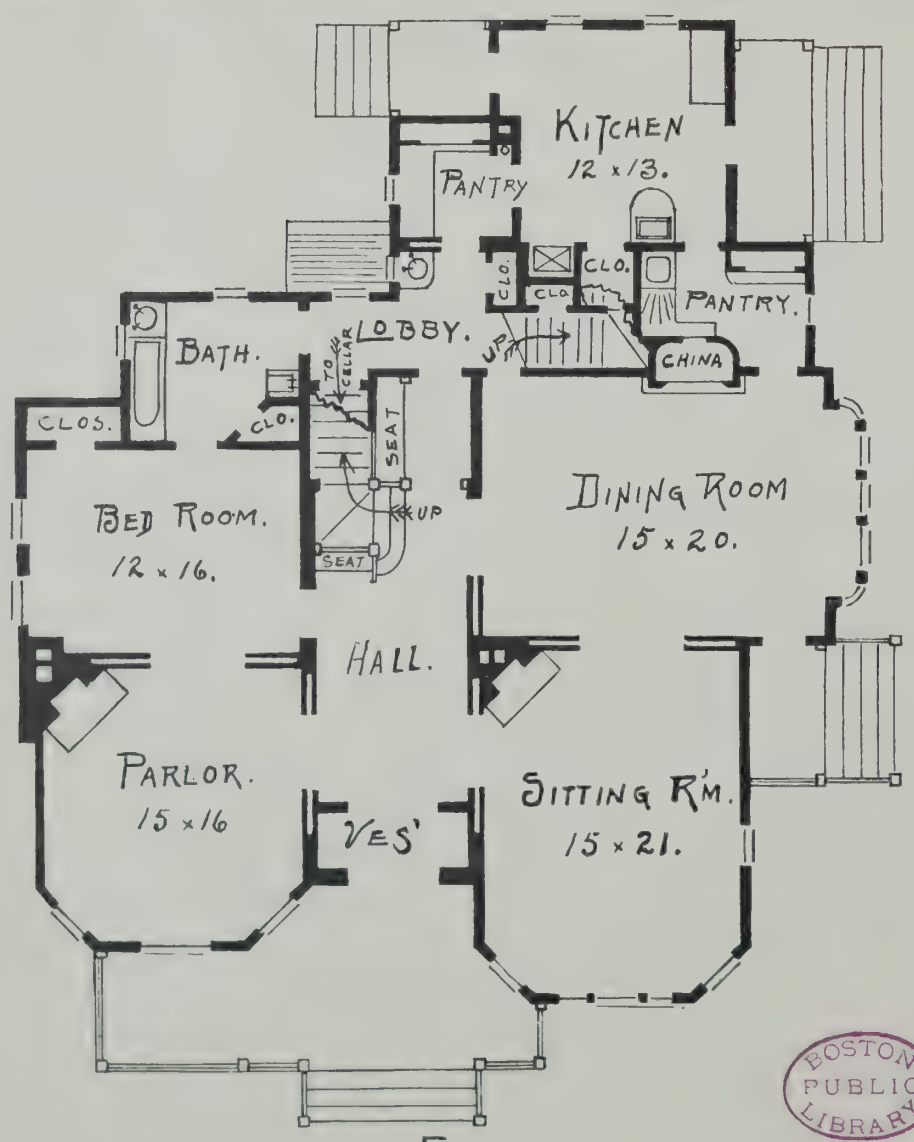

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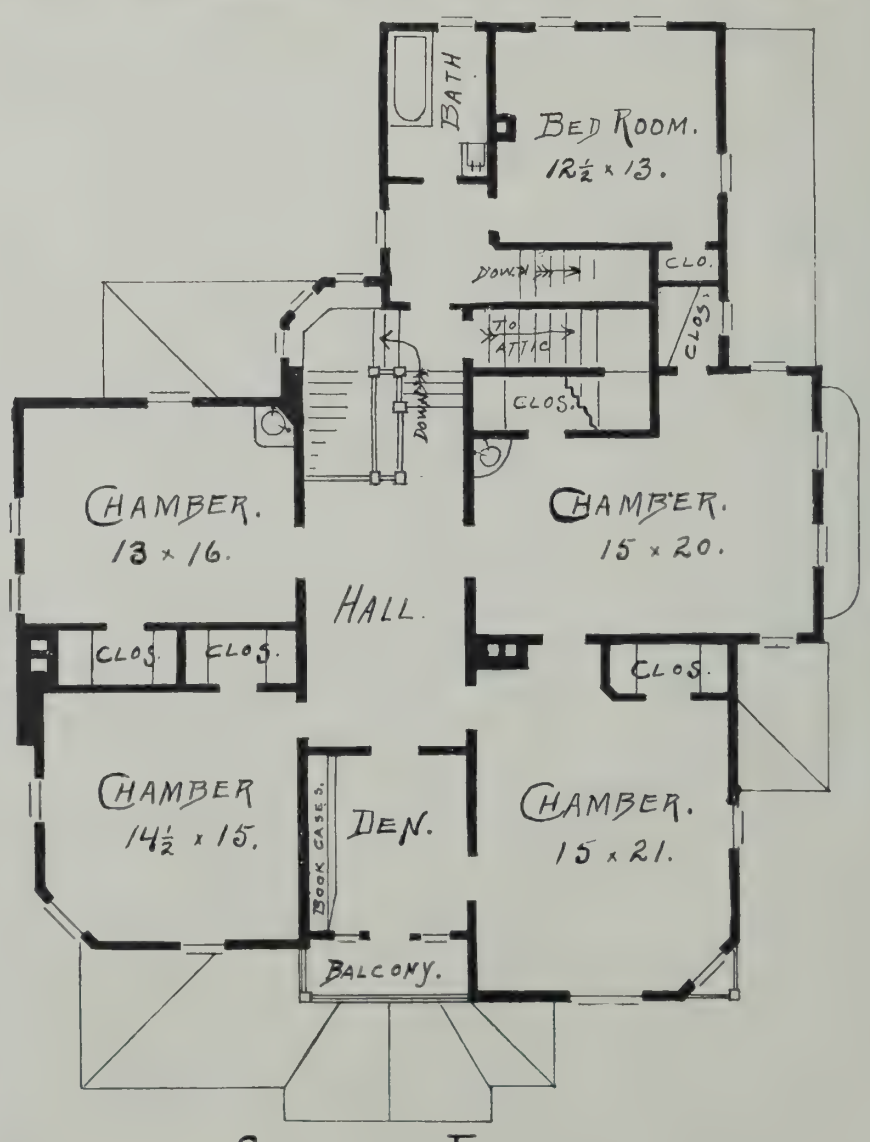

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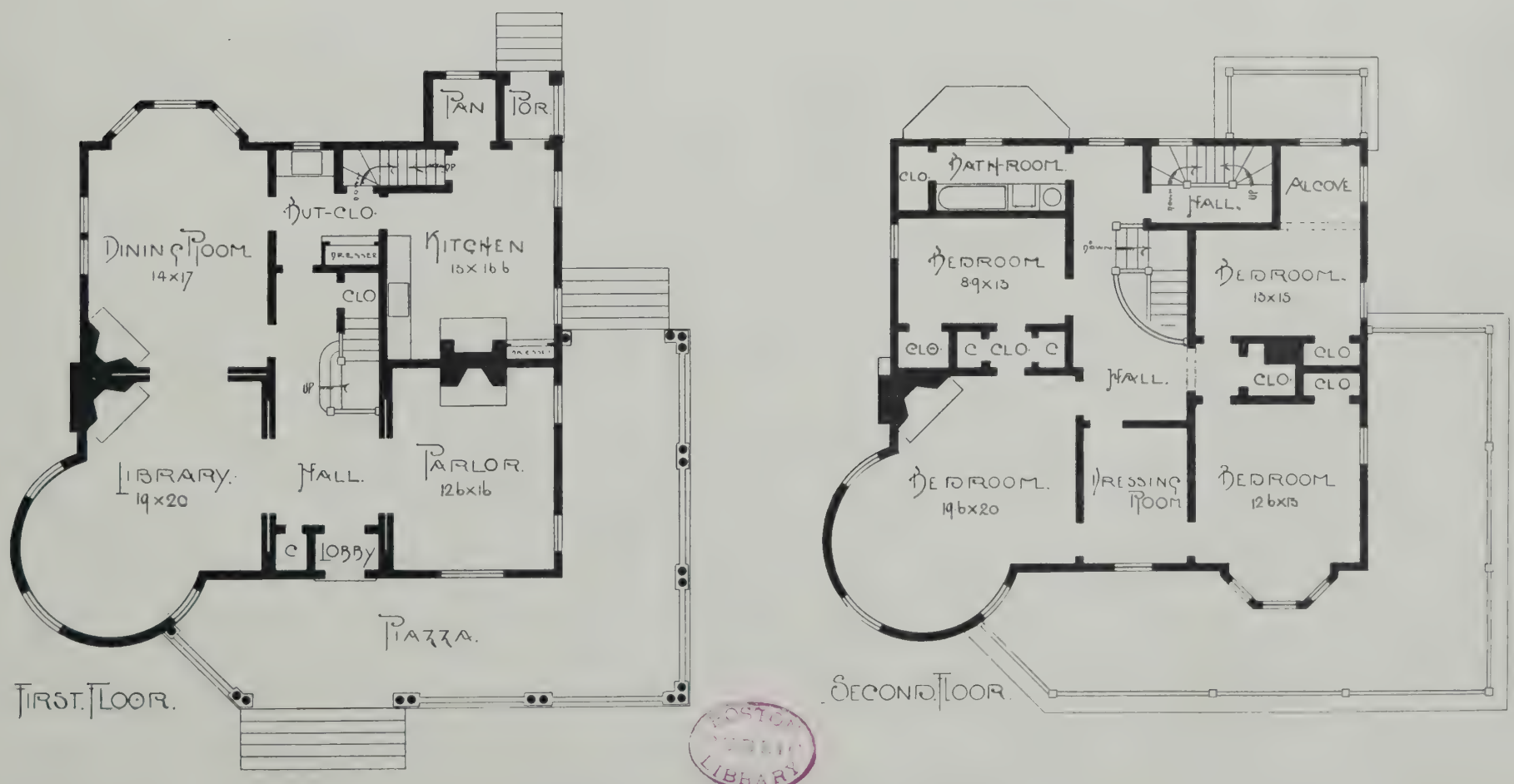

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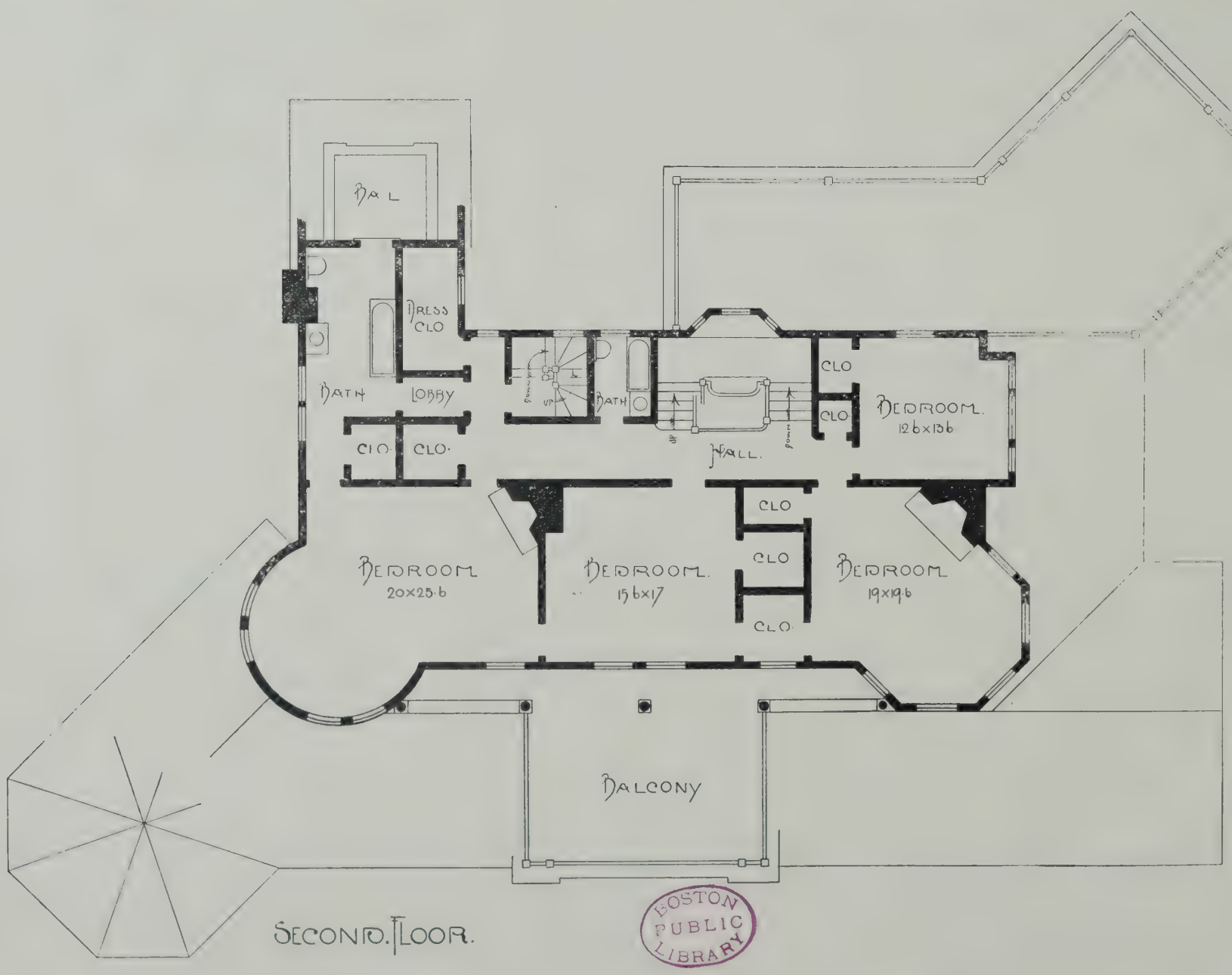

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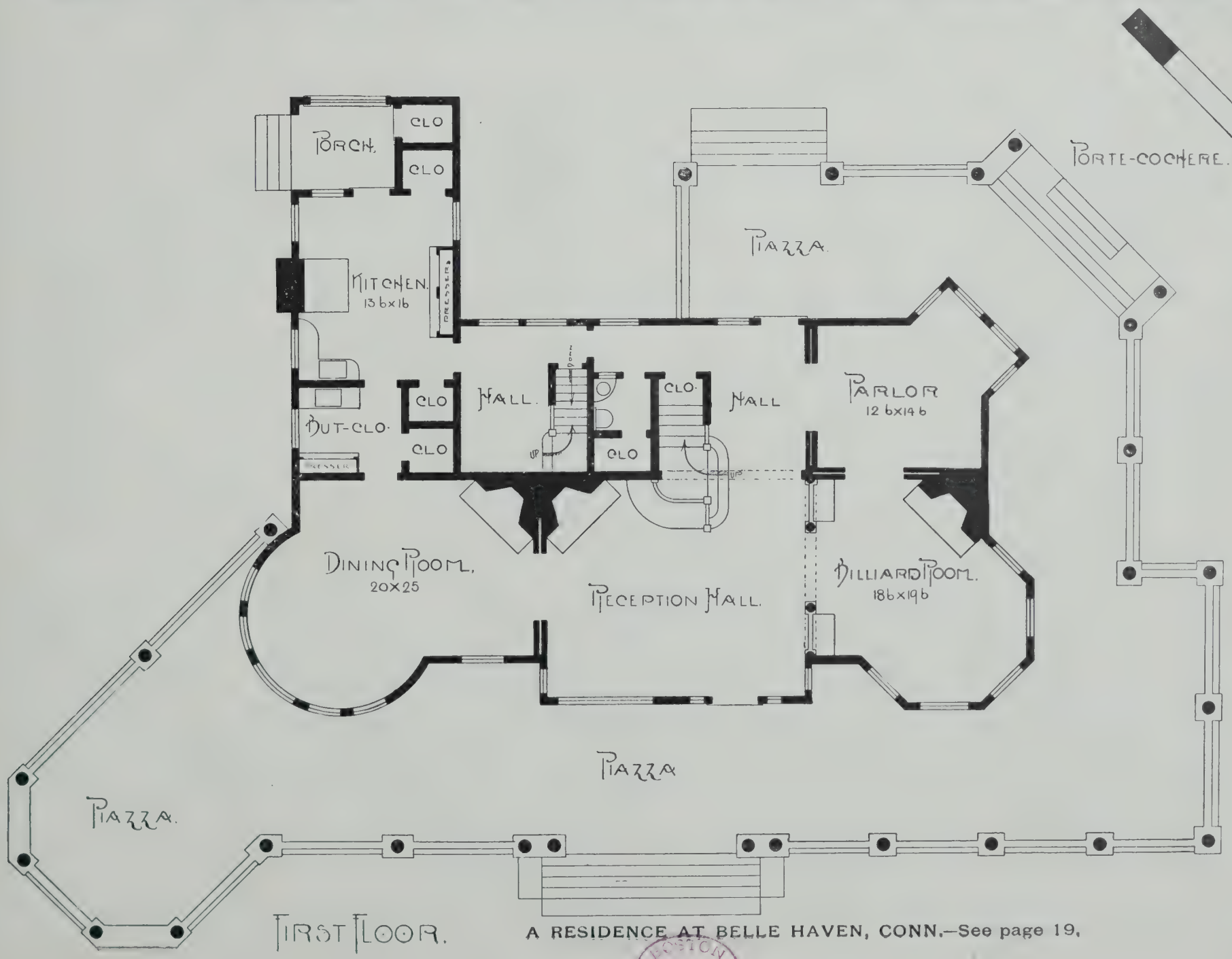

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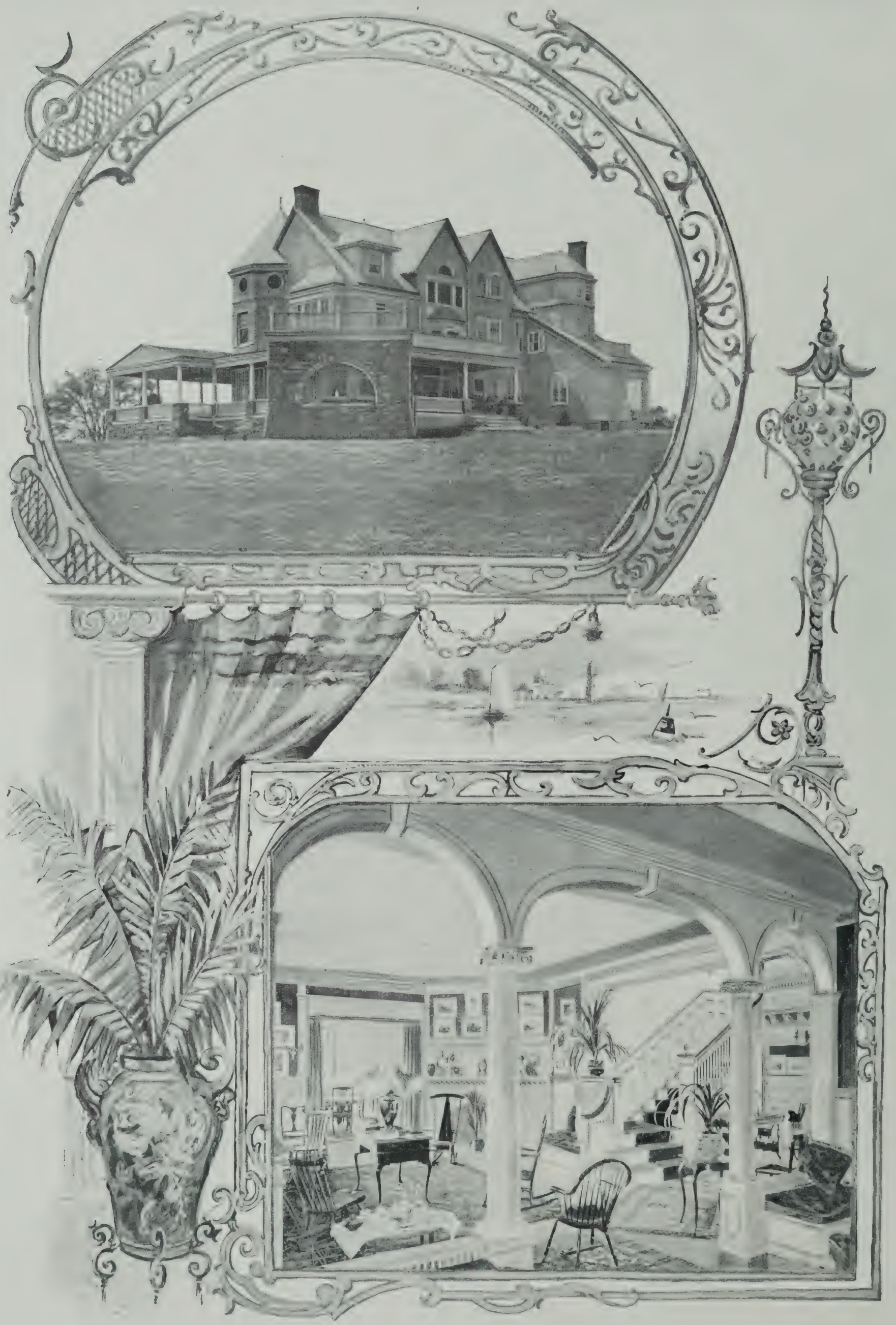

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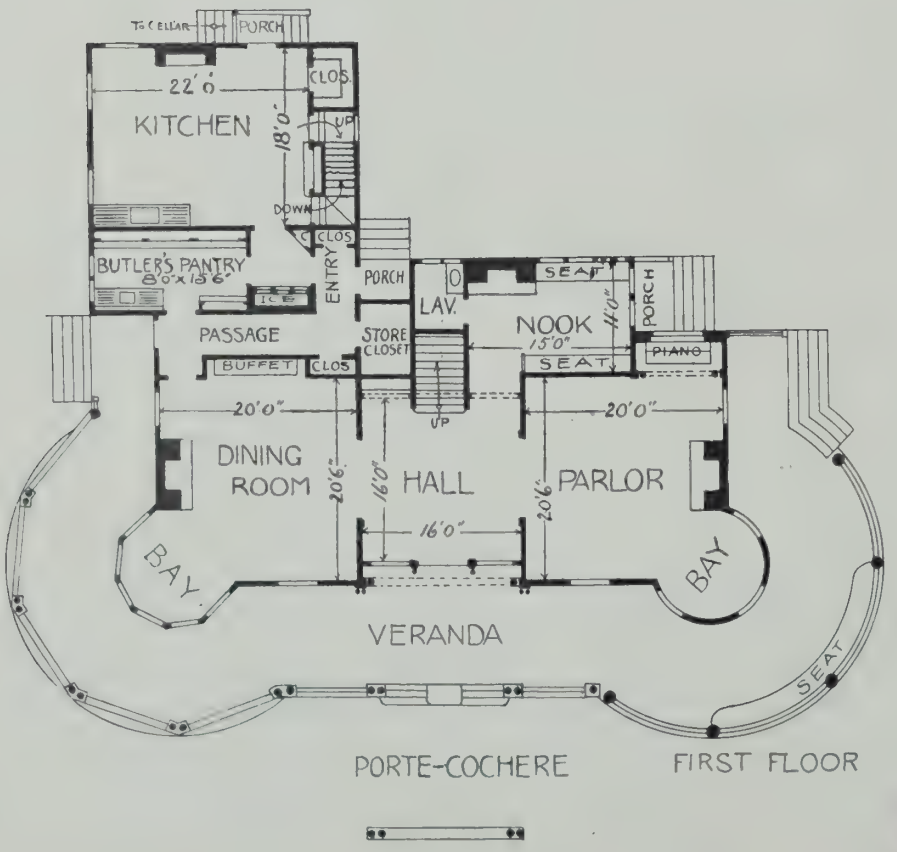

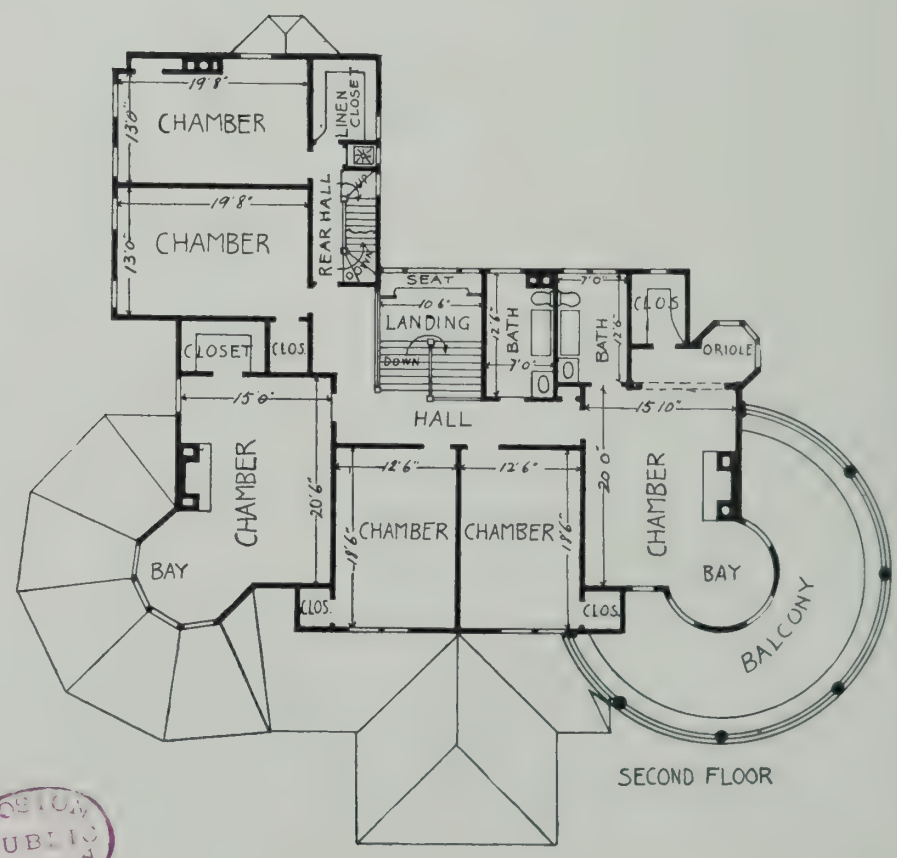

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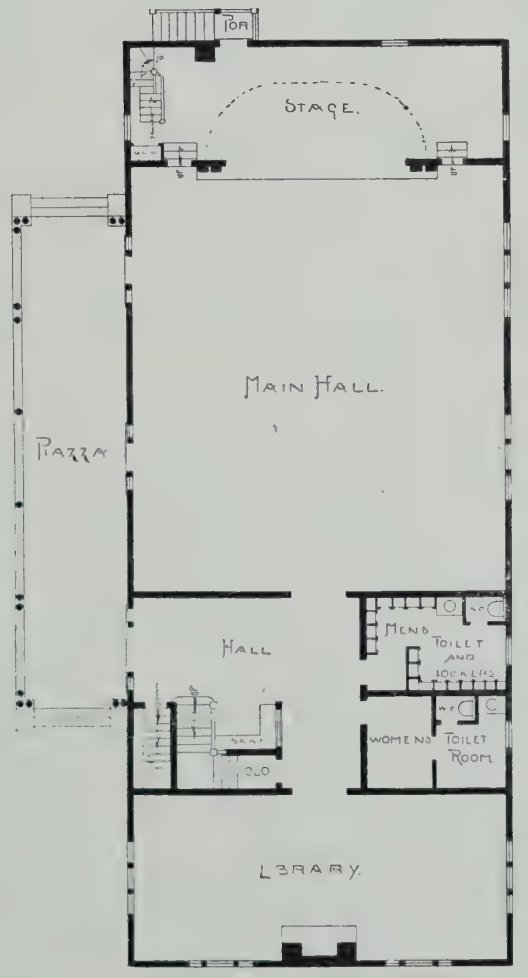

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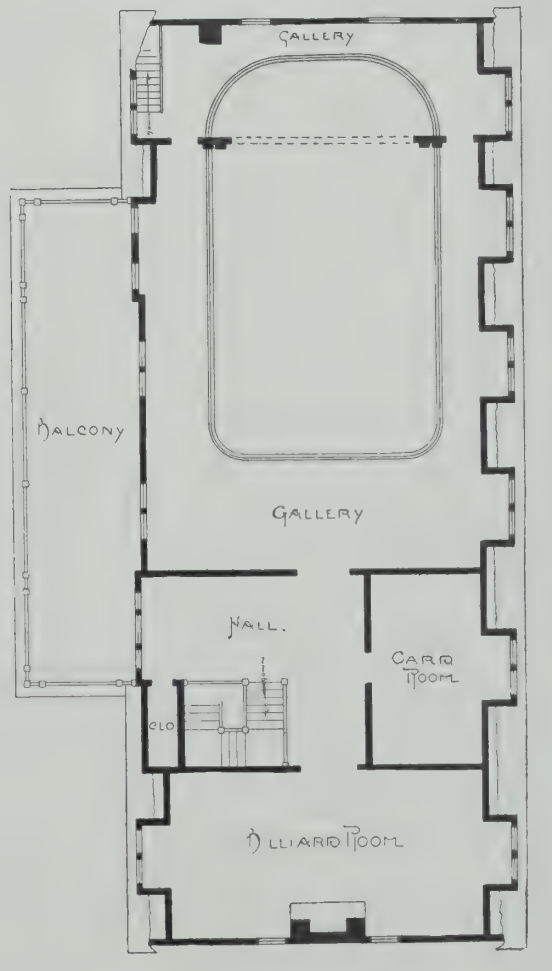
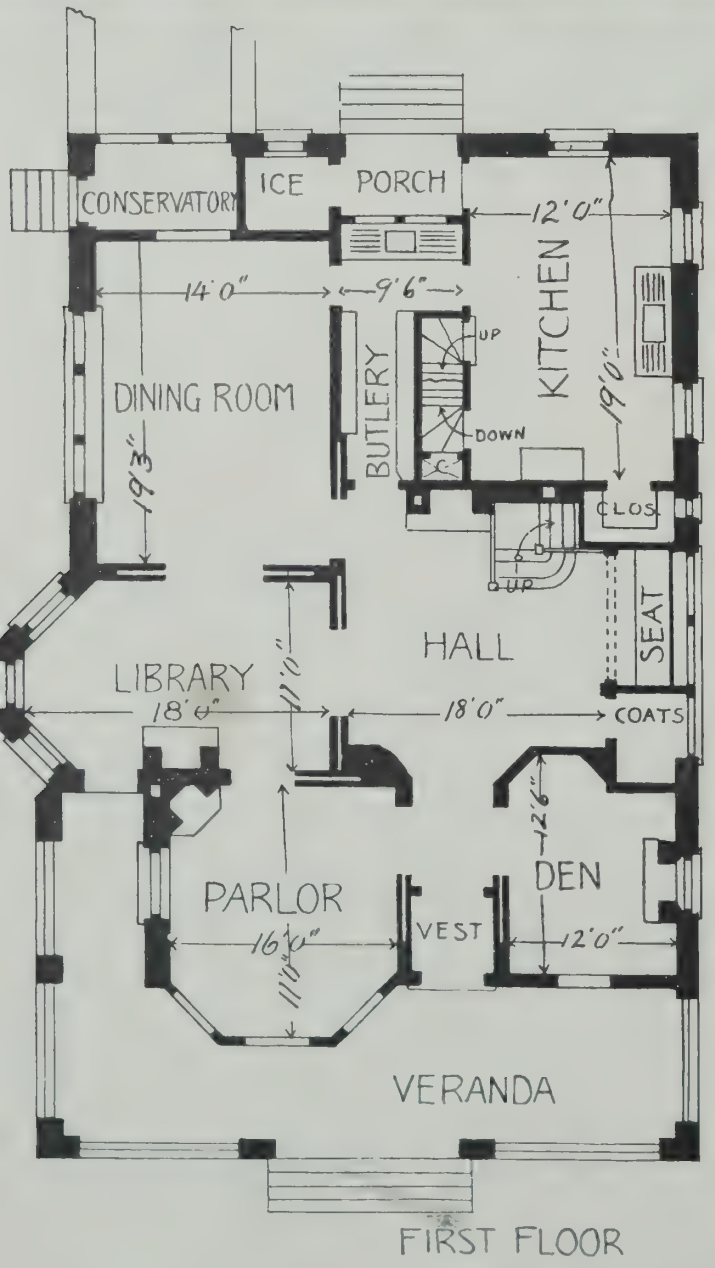


SECOND FLOOR.

HOUSE OF KNICKERBOCKER FIELD CLUB, FLATBUSH, N. Y.—See page 31.



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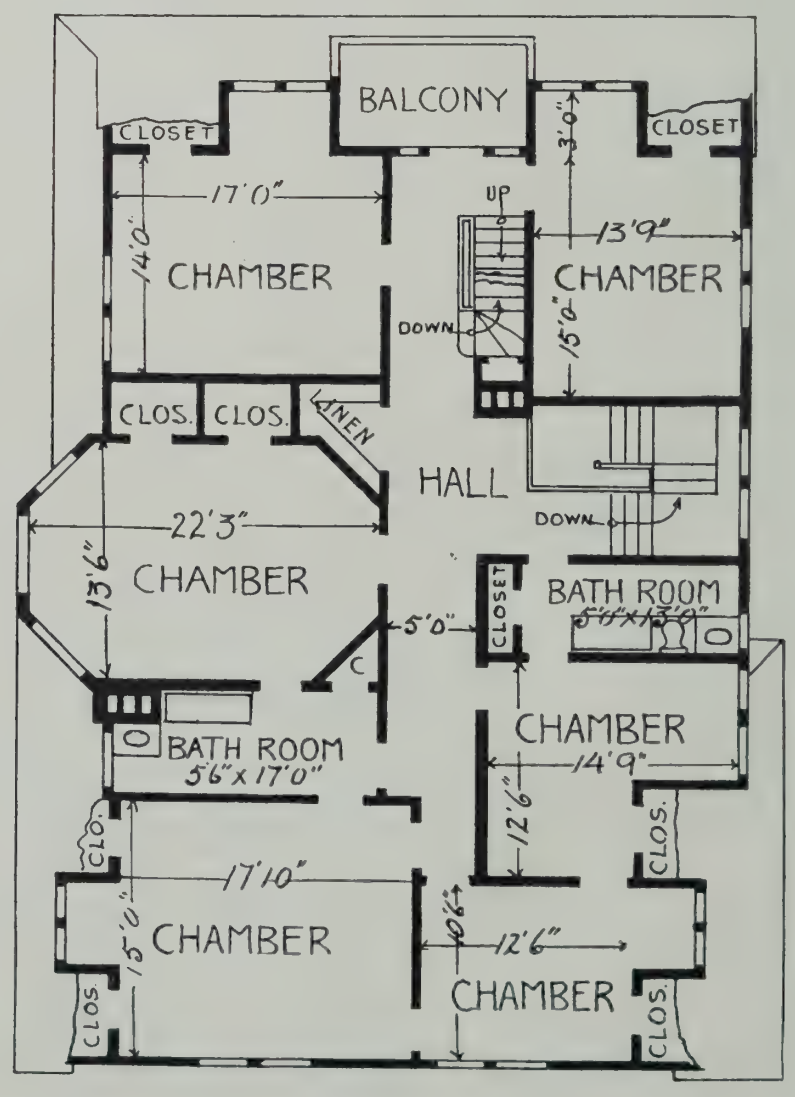


SECOND FLOOR

RESIDENCE OF A. B. BIGELOW, CRANFORD, N. J.—See page 31.

THE HOUSE OF THE KNICKERBOCKER FIELD CLUB.

We publish on page 29 engravings and floor plans of the Knickerbocker Field Club, recently erected at Flatbush, Long Island, N. Y. The clubhouse complete contains all the necessary appointments for a field and social club. The building is treated in the Colonial style, and the first story is relieved by a spacious piazza, with balcony on same. The roof is also well broken by several dormer windows. The underpinning is built of rock-faced stone laid up at random. The first story is clapboarded, and the second shingled. It is painted Colonial yellow, with ivory white trimmings. The roof is shingled also, and finished natural. The entrance hall is trimmed with yellow pine. It has a a paneled wainscoting and ceiling beams. The staircase is an ornamental one, with a paneled divan and newel posts extending to ceiling, the space between being filled in with spindlework. The library is trimmed with yellow pine, and is provided with ceiling beams and an open fireplace, built of Tiffany brick, with hearth of same, and a mantel of oak, with columns and mirror. The toilet rooms are conveniently located. The main hall is trimmed with yellow pine. The ceiling is ceiled with narrow beaded stuff, and the walls are wainscoted with same. This hall is provided with movable settees, which can be removed at pleasure for other occasions. The stage is fully equipped with all necessary fixtures. The billiard-room is provided with an open fireplace and three billiard tables. Card-room is fitted up replete. The gallery contains an ample seating capacity. Cemented cellar under whole of building contains four bowling alleys, pool tables, superintendent's office, furnace room, and other necessary apartments. Messrs. Parsett Bros., architects, Brooklyn, N. Y.

Our engravings were made direct from photographs of the buildings, taken specially for the SCIENTIFIC AMERICAN

RESIDENCE OF MR. A. B. BIGELOW, CRANFORD, N. J.

This elegant dwelling, illustrated on page 30, has a foundation of stone. First story, field stone. Second story, clapboards. Roofs, dormers, and gables, shingles. Interior finish of whitewood and California redwood. The field stone gives a sturdy effect, and the shingles, stained a silver gray, harmonize. A glance at the plans will at once give one an idea of how comfortable a home this design would make. The hall is large, well lighted, and has an open fireplace, as have parlor and dining-room. The kitchen is well provided with closets, pantries, etc., and, besides the butler's pantry, there is a refrigerator room. Five chambers, bathroom and linen closet are on second floor. Ample closets are attached to each room. There are three rooms in attic. The cost is about $6,000. Manly N. Cutter, architect, 203 Broadway, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

NONSUCH PALACE.*

(Continued from July Number.)

And now comes a singular fact: although the lower or outer court, which was only inhabited by court officials and servants, was constructed entirely of freestone, the portion of the edifice containing the royal and state apartments, the "upper court," was built of wood, except the basement; or perhaps, to speak more correctly, it was framed in wood, no doubt "post and pan" work. It would, however, appear that the wood was not visible outside, because we are informed that this part of the building was "battled" (embattled) with frames of wood covered with lead and supported with strong bars of iron, "which battlements are a great grace and a special ornament to the building." The two great towers at the south-east and southwest angles of the building were also embattled with lead, and their lanterns were covered with the same material. The southwest tower (that shown in the foreground of our drawing) was the water tower. It contained a vast cistern of lead, "of so singular a use that pipes being branched from thence supply the offices and the whole house with water." In fact, water was regularly laid on as in a modern house. It would be interesting to know whether this was the first house in England with a regular water service.

The whole of the walls of the upper building, except the basement, was covered with a series of bass-reliefs in plaster, representing figures and various scenes. It has been stated that these were composed of "rye dough."† Now, although rye dough may have entered into the composition, as it does into that of some modern kinds of stucco, yet, of course, it would not be sufficiently hard or white for the purpose alone. The German black bread does certainly get hard when stale, but if you soak it in water for a month or two it can be eaten in soup, but we never heard of its being used for building. There is, however, a passage in Leland, quoted by Lysons, which seems to offer some solution of the difficulty. Leland says that at Cuddington, where the king (Henry VIII.) was building, "is a vaine of fine yerth, to make moldes for goldsmithies and casters of metale, that a loade of it sold for a croune of golde. Like yerth to this is not found in all Englande." Now, may not this "yerth," when mixed with the rye dough, have formed a fine, hard plaster or stucco, in which these figures were either modeled or cast?

The gardens of Nonsuch Palace seem to have been as remarkable as the building itself. The principal garden appears to have surrounded the three external sides of the inner court, and probably from the fact that the private chambers of the king and queen overlooked it was called the "Privy Garden." The survey informs us that there was "a large garden called Privye Garden" lying round and adjoining into the three outsides of the inward court building—inclosed by a brick wall 14 ft. high, cut out and divided into alleys, quarters and rounds, set about with thorn hedges.

"In the said garden there is one piramede or spired pinacle of stone," and near which, against the west turret, is placed one "large marble 'wash boule,' over which stands a marble pelican, fed with a pipe of lead to convey water into the same. There are also two other marble pinacles or piramedes called the 'Powlcon perches' (falcon perches), between which a fountain of white marble with a lead cistern, which fountain is set round with six trees called *leylack trees*, which trees bear no fruite, but only a very pleasant flower." There are also "in the said privey garden one hundred and forty fruit trees, two ewe trees, and one juniper tree," etc.

These fountains and the large stone pinnacle are all shown in the view by Jodoc Hondius. Probably the account given by Hetzner, who visited the place in Elizabeth's time, is not much exaggerated; he says that it was built "with an excess of magnificence and elegance even to ostentation; one would imagine everything that architecture can perform to have been employed in this one work; there are everywhere so many statues that seem to breathe, so many miracles of consummate art, so many casts that rival even the perfection of Roman antiquity, that it may well claim and justify its name of Nonsuch, being without an equal, or, as the poet sings:

"This which no equal has in art or fame,
Britons deservedly do Nonsuch name."

H. W. B.

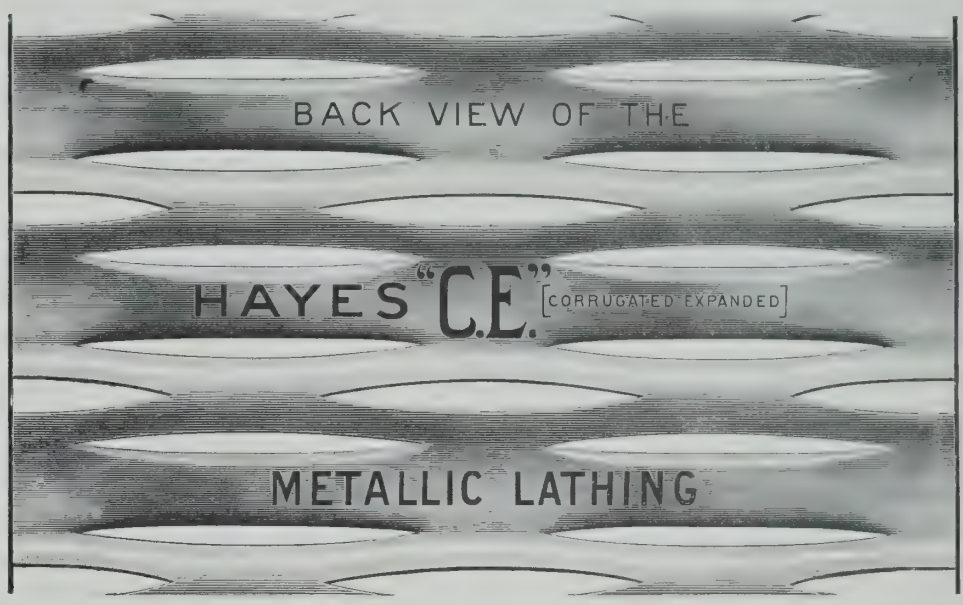
* From the *Builder*, London.

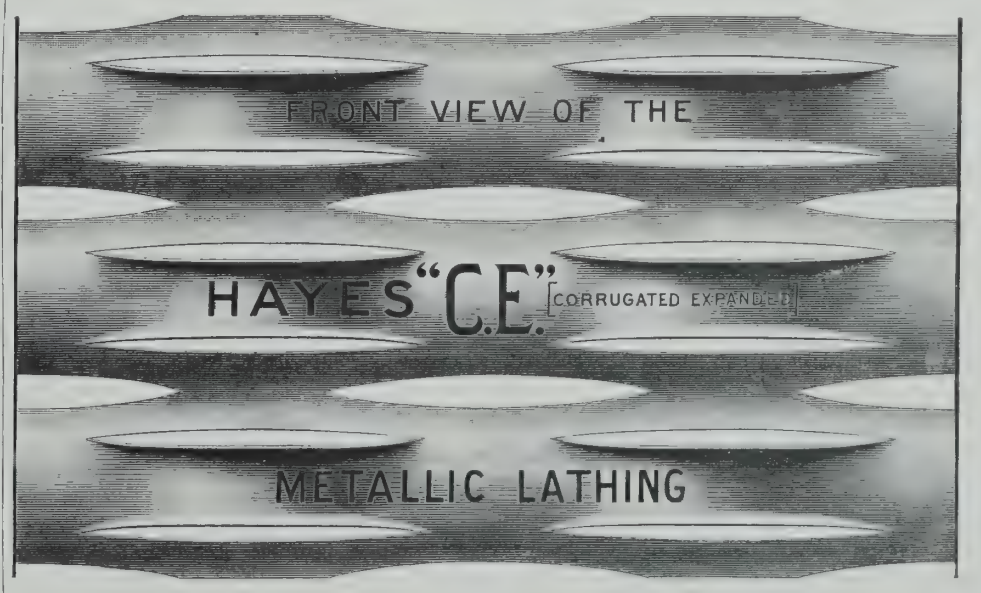
† Lysons' "Environs of London," second edition, p. 111, note 58.

THE HAYES METALLIC LATHING.

Mr. George Hayes, whose inventions in connection with architectural engineering have been extensively adopted, has presented some further valuable improvements in metallic lathing, patented in the United States and many foreign countries. He takes a sheet metal blank, say 30 by 96 inches, corrugates and otherwise forces it out of plane, after making at prescribed intervals over its entire surface certain slits or openings, which in the process of manufacture are expanded, the outlines thereof being double arc lines, one on each side of the chord forming lanceolated openings, their axes representing the true length of the metal employed. These apertures are arranged longitudinally, occurring in the depressions, while upon the elevations are formed a series of arched loops, having a concave crown, the depressions and elevations being and forming the corrugated surface, while the loops give the appearance of transverse corrugations. The sheet, in the operation of being slitted or apertured at regular intervals over its surface, for the time being becomes weakened, but in the further process of manufacture it regains its strength and rigidity as it assumes its corrugated form. A sheet of metal lathing so corrugated partakes of all the strength and rigidity of an ordinary corrugated sheet, and, when re-enforced with plastic material, becomes as substantial as a slab of stone. Mr. Hayes does not confine himself to one particular pattern or form of lathing, but has contrived to produce a variety, all embodying the same fundamental principle. The one here illustrated is, however, the one most effective.

This lathing is easily handled and applied, there are no cutting edges or points to injure the hands, it is readily cut to any size with an ordinary pair of tinsmith's shears, and can be readily bent into any form. It possesses a most perfect clinch or bond for the mortar, can be plastered on both sides, and does not permit a free escape or waste of mortar. The application of a good metallic lathing of this kind at one renders a building fire, water, and vermin proof. Further information regarding this improved lathing may be had by addressing Mr. Geo. Hayes, No. 71 Eighth Avenue, New York City.





The Jos. Dixon Crucible Co.

The stockholders of this company recently elected Mr. E. F. C. Young, president, John A. Walker, vice-president and treasurer, George E. Long, secretary. The Dixon Company was founded by Joseph Dixon in 1827, and organized as a stock company in 1868. Its manufactures are graphite products of all kinds, consisting of plumbago crucibles for melting gold, silver, brass, etc.; blacklead retorts, stove polish, graphite for lubricating, electrotyper's graphite, graphite lead pencils, graphite paint, and graphite prepared in hundreds of ways for as many different uses. Graphite is one of the principal forms of carbon. It is not affected by heat or cold, acids or alkalies, and is therefore one of the most useful materials known to modern industry when rightly prepared.

The company are putting a Cycle Chain Graphite on the market, which, for purity of graphite and usefulness, is claimed to be vastly superior to anything of the kind heretofore prepared. When applied to the chain of a bicycle, it penetrates the bearings, and thoroughly lubricates and protects them from wear and rust. The company will shortly put the same material on the market in the form of a solid stick, for the convenience of wheelmen who wish to carry it in their tool bags.

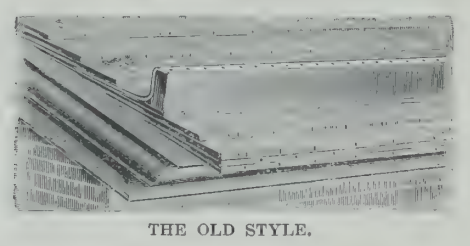
The Slate Business.

The Slatington-Bangor Slate Syndicate, Slatington, Pa., miners and shippers of roofing slate, report total shipments of 20,421 squares for the first five months of the year, being about double the business done in the same time last year. The syndicate ships from more than nineteen different quarries in the Slatington region, including the Franklin and Washington veins; from fourteen quarries in Northampton County, and from the best Peach Bottom and Vermont quarries. They have exclusive control of many of the leading brands of slate, including the American Bangor Quarry and the Star Quarry at Bangor, which now manufacture one-third of all the genuine Bangor slate produced.

NEW AND OLD STYLES OF EAVES TROUGHS.

The open gutter, shown in the top view, is free to expand and shrink, and has no stems or crossbars to stop the flow of leaves or rubbish. The gutter is made in long lengths of heavy plate, galvanized, with slip joints, and hung only with supporting hangers from below, leaving it entirely clear inside or on top, allowing it to expand when filled with ice, and to wash out clean. This style of hanger is made by Berger Bros., manufacturers of tinners' hardware and roofers' supplies, 237 Arch Street, Philadelphia. The fasteners or shanks are made in several styles, suited to all styles of finish on the eaves, being more or less concealed by slipping them under the shingles, or by nailing them to the sides of the rafters or on the mouldings behind the gutters.

THE NEW STYLE.



THE OLD STYLE.

THE BERGER HANGER FOR EAVES TROUGHS.

The second view shows a more costly and more troublesome gutter, because it is so likely to get out of order, and on account of the constant dripping from the courses below the gutter.

The Weathered Hot Water Heaters.

Thos. W. Weathered's Sons, of this city, the manufacturers of these well-known heaters, have just issued an illustrated catalogue, which is well worth the examination of all who contemplate enlarging or putting in new apparatus for all kinds of hot water heating, especially for heating dwellings, churches, schoolhouses, etc. The Weathered boiler is itself a standard, being simple in construction and rapid in action, many of these boilers being still in use, and doing good service, that were put in over twenty-five years ago.

DESIGN FOR MANTEL AND FIREPLACE.

The illustration represents an original design for mantel and fireplace, which appears in the handsome illustrated catalogue of the Wisconsin Fireplace Company, A421 Broadway, Milwaukee. The company manufacture fine hardwood mantels, and furnish the fine art tiles and brass goods in exclusive designs to match the mantels. When one chooses one of these mantels appropriate to the style of the room, everything connected therewith is designed to be in good taste and harmonize with the surroundings, the tiles, frame, back, grate or andirons, and all other metal goods, following the style of the mantel. A variety of designs is presented suitable for the hall, parlor, dining-room, boudoir, etc., for private houses and hotels and flats.

DESIGN FOR MANTEL AND FIREPLACE.

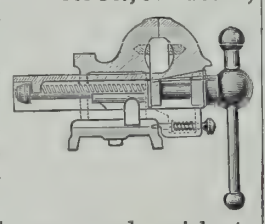
CERTAIN species of ants make slaves of others. If a colony of slave making ants is changing the nest, a matter which is left to the discretion of the slaves, the latter carry their mistresses to their new home. One kind of slave making ants has become so dependent on slaves, that even if provided with food they will die of hunger unless there are slaves to put it in their mouths.

The "P. & B." Sheathing and Insulating Papers.

The Standard Paint Company, of New York, after four years of litigation, have obtained a decision, in the U. S. Circuit Court of New Jersey, fully maintaining the validity of the patent under which the company manufactures a paper coated with the solid residuum of petroleum, and combining the characteristics of an odorless, water, acid, alkali and air proof paper, the Court also holding that any paper possessing the same essential characteristics, and produced by the coating with any material similar to that employed by this company, is likewise an infringement of their patent. The Court made an order for a permanent injunction against the defendant infringers, and for an accounting.

AN IMPROVED VISE.

The accompanying sectional view gives a good idea of the practical workings of the "Electric" Machinist's Swivel Bottom Iron Working Vise, made by the Capital Machine Tool Co., of Auburn, N. Y. It is a recently patented improvement, representing some excellent practical ideas. It combines strength, durability, and simplicity, and is remarkably easy and quick to operate. Its quick movement has made it a prime favorite in a very brief period.



THE IRWIN AUGER BIT COMPANY, of Wilmington, O., issue a most attractive catalogue and price list of the Irwin patent solid centre stem augers and bits. The company have a large manufacturing plant, whose capacity has been steadily growing for several years, and make bits of a superior quality and finish. No pressure is required in boring with them, and they will bore either in end or side of wood.

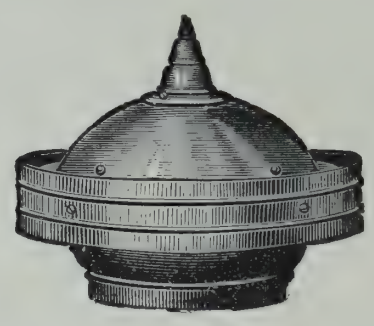
What Becomes of all the Lumber.

It is estimated that, of the general lumber product, 35 per cent. goes into buildings, 45 per cent. into railroads and miscellaneous uses, and 20 per cent. into boxes.

THE architectural sheet metal work made by the Berger Manufacturing Company, of Canton, O., includes a most extensive variety of goods, comprising steel, iron and tin roofing and siding in many varieties, metallic ceilings, cornices, iron shutters and doors, architectural sheet metal, etc. All architects and builders should send for their handsomely illustrated large quarto catalogue, just issued.

THE GLOBE VENTILATOR.

The attic of a house, or in city houses the space between the roof and the ceiling of the top floor, may at first sight seem an insignificant part of a residence, but the fact is this space or attic is a very important factor in cooling the house properly. If the attic is well ventilated, and it can only be properly done through the roof, there will be considerable relief from the furnace-like heat which haunts attics for weeks at a time during the heated term, and makes access to them very uncomfortable. In the "Globe Ventilator" which we illustrate herewith will be found an effective stormproof ventilator, adapted for the roofs of churches, halls, lodge rooms, residences, etc. The use of such a ventilator on summer cottages is very advantageous, as where a house is closed part of the year, especially during the winter season, the house is apt to become mouldy or musty, but with properly contrived ventilators this difficulty is obviated, and when the house is opened in springtime the rooms will be found dry and sweet. With the Globe Ventilators, openings may be cut through the ceilings of sleeping rooms into attics, and thus an efficient system of ventilation is obtained at a low cost. With the use of these ventilators the odors from the kitchen are also entirely removed. We illustrate one of the Globe Ventilators, and also the residence of Mr. H. W. Gardner, Lansingburgh, N. Y., showing the Globe Ventilators in position. For further information our readers are referred to the manufacturers, the Globe Ventilator Co., Troy, N. Y.



RESIDENCE OF H. W. GARDNER, LANSINGBURGH, N. Y., SHOWING GLOBE VENTILATORS ON ATTIC.

AN IMPROVED SADIRON.

The many advantages possessed by a smoothing iron, such as shown in the illustration, are apparent at a glance, and cannot fail to be appreciated by any housewife, laundress, or tailor. The cost of gas used is but trifling, and no extra fixtures are required, while the fuel used to heat the iron by a stove, in the ordinary way, is saved, and overheated rooms from this cause are avoided. The iron is finely nickelplated, and has in the rear an atmospheric burner, insuring perfect combustion, producing intense heat, with entire freedom from soot. It is manufactured by the Bolgiano Manufacturing Company, No. 415 Water Street, Baltimore, Md.

THE BOLGIANO GAS-HEATED SADIRON.

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A COLONIAL RESIDENCE AT PORTCHESTER, N. Y.—See page 34.

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THE

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(Illustrated articles are marked with an asterisk.)

A COLONIAL RESIDENCE AT PORTCHESTER, N. Y.

One of our plates in colors this month illustrates a residence recently completed for George Mertz, Esq., at Portchester, New York. On page 33 we give two additional views. The design is treated in the Colonial style. Its broad, spacious, and well shaded piazza, the pleasant balcony, and the several bay windows are some of the features of the exterior, while the plan shows a spacious hall and several large rooms that are finished in an excellent manner. The foundation is built of stone, and the underpinning of Tiffany brick. The exterior framework above is sheathed and covered with clapboarding, and is painted Colonial yellow, with ivory white trimmings. The blinds are painted bottle green. The roof is covered with shingles, and is left to weather finish. Dimensions: Front, 49 ft; side 36 ft., exclusive of piazza and porch. Height of ceilings: Cellar, 7 ft., first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. Lobby has a tiled floor, and is paneled with sycamore. The hall and library are trimmed with sycamore, darkened and finished natural. The former has a paneled wainscoting and ceiling beams. The staircase is built of similar wood, with carved newel post, spindle balusters and rail. This stairway is lighted by a cluster of windows, glazed with delicate tinted glass, shedding a pleasant light over upper and lower halls. The library and hall are separated by columns with carved capitals extending to ceiling, and supporting a ceiling beam with an arcaded effect. The library has a paneled divan and bookcase built in, with shelves inclosed with beveled glass doors. The fireplace is provided with tiled hearth and facings and a hardwood mantel. Parlor is trimmed with pine, and is treated with ivory white and gold in a dainty manner. It contains a fireplace, with white onyx tile trimmings and a Colonial mantel made from special design. Dining-room is trimmed with birch, and it has walls panelled and ceiling beamed. The fireplace has a mantel with columns. The china cabinet is inclosed with leaded glass doors. Butler's closet and kitchen are trimmed and wainscoted with hard pine and finished natural. The former contains bowl, drawers, and dressers. Kitchen is fitted up with the usual fixtures complete. The second floor is trimmed with white pine, and is treated in colors. This floor contains four bedrooms, eight closets, den and bathroom. Bathroom is paved and wainscoted with tiles, and is furnished with the usual fixtures, with exposed plumbing, all nickelplated. The third floor contains one bedroom, billiard room, and two trunk rooms. Cemented cellar contains laundry, furnace, and other necessary apartments. Mr. Louis Mertz, architect, Portchester, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE OF FREDERICK WOOLLVEN, ESQ., ROSEMONT, PENN.

We present on page 39 the residence of Frederick Woollven, Esq., at Rosemont, Penn. Dimensions: Front, 29 ft. 10 in.; side, 39 ft. 4 in., not including front or rear porch. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft 6 in. The design, while quite plain, is effectively treated in the Colonial style. Underpinning is of local stone. The house above is of frame construction, covered with felt paper and clapboards, which are painted yellow. Roof is shingled and left to weather; trimming color cream white. Chimneys, brick, capped with stone. There is a piazza, which is roofed on southern exposure and at entrance, in the latter instance being supported by two brackets and a column. The entrance door is nicely paneled, and is glazed diamond shape, being protected by a wrought iron grille of good design. The reception hall has an arched fireplace of Pompeian brick, with mantel above, seat with locker beneath, and staircase with ornamental newel; it is lighted by a broad leaded glass window. Parlor has angle fireplace with mantel, and connects with dining room. Pantry has a broad dresser and sink. Kitchen is fitted with the usual fixtures. Second floor contains four good sized bedrooms, with ample closet accommodation, linen closet and bath. Attic has one room finished off. Cellar is cemented, and has furnace, fuel, storage, etc. The house is trimmed in white pine, hard oil finish. Principal rooms have hardwood floors. The work throughout is of the best, and was built under the personal supervision of the architect, Mr. J. D. Thomas, Philadelphia, Penn., and cost complete $4,800.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

"WYNDECOTE," A RESIDENCE AT SOUTHAMPTON, LONG ISLAND.

We illustrate by plate in colors a residence recently completed for R. H. Robertson, Esq., at Southampton, Long Island. On page 35 we present an additional view of the house. The building is picturesque and pleasing, and is so situated that it overlooks the Ocean. The design is an admirable model for a seashore dwelling, with its spacious and well shaded piazza, pleasant veranda, and low, slanting roof. The exterior walls are built of wood, and the first story is clapboarded and painted light olive brown, with bottle green trimmings, while the second and third stories are shingled and painted olive yellow, with similar trimmings. Dimensions: Front, 40 ft; side, 70 ft. 8 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The interior throughout is trimmed with whitewood. The first floor is finished in cherry in a most excellent manner. The entrance hall and staircase and main hall are provided with a paneled wainscoting and a heavy beamed ceiling, forming deep panels. The staircase is a handsome one, with carved newel posts. The den, or reception room, is conveniently located, while the dining-room is separated by an archway with spindle transom, and is provided with a buffet built in nook, with a cluster of small windows, glazed with delicate tinted glass, which shed a soft light over this apartment. The fireplaces, where shown, are built of brick, with furnishings of tiles and mantels of hardwood, and ornamental in design. The bedroom on this floor is intended for a guest chamber. Kitchen, pantries, servants' dining hall, laundry and woodshed are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures in a most complete manner respectively. The second floor is treated with colors in a delicate manner. There are four bedrooms, maid's bedroom, dressing-room and bathroom, besides two bedrooms for servants, with private hall and stairway, on this floor, and billiard room, one bedroom and ample storage on third floor. The bathroom is wainscoted and furnished replete. Mr. R. H. Robertson, architect, 160 Fifth Avenue, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT ROGERS PARK, ILL.

The engravings and floor plans presented on page 36 illustrate a cottage, Colonial in treatment, recently erected for Edward King, Esq., at Rogers Park, Illinois. The whole design is treated in a unique manner, and it combines both pleasing elevations with many excellent features and well arranged plans. The underpinning, first story up to window sills, and posts at piazza and porch are built of rock-faced Darlington sandstone. The remainder of the first story is clapboarded and painted olive yellow, with white trimmings. Second and third stories are shingled and stained sienna. The roof is also shingled and stained moss green. Dimensions: Front, 37 ft.; side, 36 ft., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with oak. Hall contains an ornamental staircase, with seat and bay window thrown out at first landing, nook containing fireplace with seats on either side, and closet provided with a stationary bowl. The staircase is lighted by stained glass windows with good effect. Parlor contains a pleasant nook with paneled divan. The archways are fitted up with spindle transoms. Dining-room is furnished with an alcove, with buffet built in and carved in a handsome style, and a fireplace trimmed with tiles and provided with a mantel. The windows on either side of this fireplace run down to floor. The other windows throughout have stained glass transoms. Hardwood floors throughout. Kitchen and pantries are trimmed and wainscoted in a handsome manner, and are furnished with the usual fixtures complete. Lobby is large enough to admit ice box. Second floor contains four bedrooms, large closets and bathroom; the latter wainscoted and fitted up complete. Third floor contains one bedroom and ample storage. Cemented cellar contains furnace, laundry and other apartments. Mr. Geo. W. Maher, architect, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

PROF. LANGLEY demonstrates that if a body of coal sufficiently large to last the United States a thousand years should be set on fire, the heat given forth from it would not equal that which the sun gives out in the thousandth part of a second.

A COTTAGE AT HOLLIS, LONG ISLAND.

We present on page 41 a cottage of low cost, recently completed for the German-American Real Estate Co., at Hollis, Long Island. The elevations are designed in an attractive manner, and the plans are arranged in a most convenient manner. The foundation and underpinning are built of brick. The exterior walls are sheathed, clapboarded and painted olive yellow, with bottle-green trimmings. The roof is shingled. Dimensions: Front, 29 ft.; side, 37 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 8 ft. 6 in; second, 8 ft. The interior is trimmed with white pine, the first story being finished natural, while the second story is treated in colors. Hall contains an ornamental staircase turned out of yellow pine. It is lighted by stained glass windows. Parlor and dining-room are each furnished with open fireplaces, provided with tiled hearths and facings and ornamental oak mantels. Library is conveniently located and is isolated from the remainder of the house. Kitchen and pantries are wainscoted and fitted up with the usual fixtures complete. Second floor contains three bedrooms, den and bathroom; the latter is wainscoted and provided with the necessary furnishings. The third floor contains ample storage room, and several bedrooms could be finished off if desired. Cemented cellar contains furnace and other apartments. Cost, $3,200 complete. Mr. Edward Grosse, builder, same place.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

SAINT GABRIEL'S CHAPEL.

The perspective view presented on page 42, with floor plan, illustrates Saint Gabriel's Chapel, recently erected at Hollis, Long Island. The design is unique for a small chapel, and the plan most excellent. The underpinning and first story up to window sills are built of rock-faced stone laid up at random. The superstructure is built of wood, with the exterior walls covered with shingles, and stained mahogany color. The roof is shingled also and left to weather finish. The auditorium, thirty feet by sixty-three feet, has a seating capacity for one hundred and eighty. It is trimmed with ash throughout, and finished natural. The roof beams are exposed to view, and are dressed, chamfered and finished natural. The space between ceiling beams is filled in with narrow beaded stuff. The altar is of oak, handsomely carved, with a rose window over same. The other windows are glazed with cathedral glass. Cost of chapel complete, $5,000. Cost of furnishing, $1,500, complete. Total, $6,500. Mr. Manly N. Cutter, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT ORANGE, N. J.

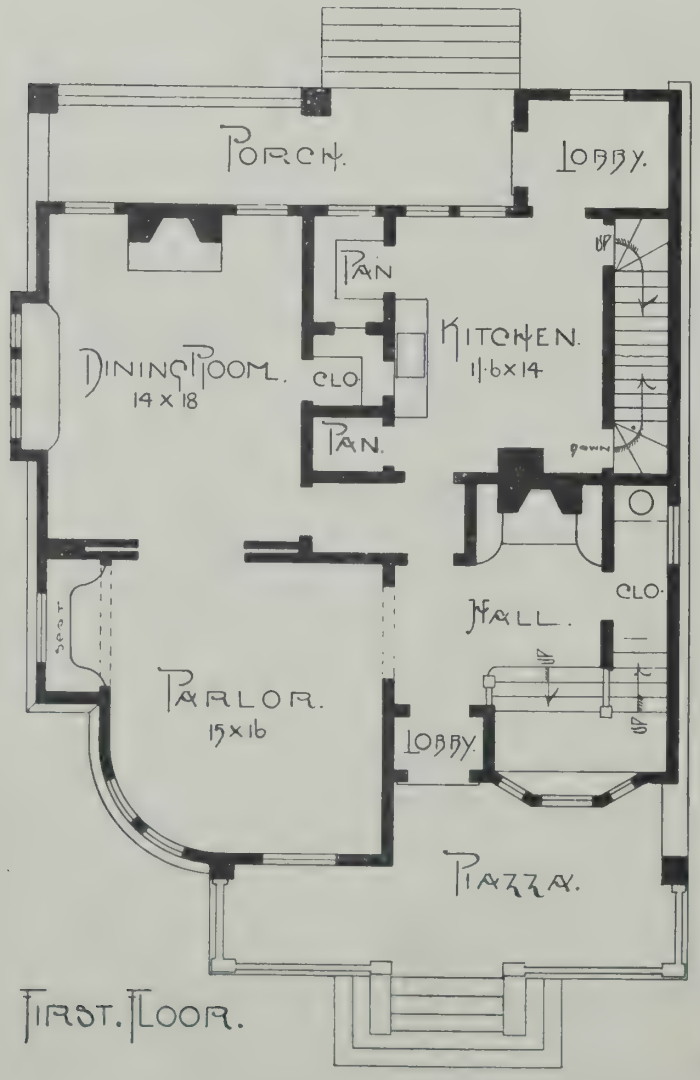
We present on page 43 the perspective and floor plans of a residence recently erected for Homer F. Emens, Esq., "Scenic Painter," at East Orange, New Jersey. The building is treated in the Colonial style, and the elevations are designed in a most artistic and pleasing manner. There are a spacious piazza, with a stone column extending to ceiling and supporting second story, a bay window, with seat and casement, and a chimney, which is an architectural feature in itself. The underpinning is built of local rock faced stone. The first story is clapboarded and the second story shingled. It is painted olive yellow, with ivory white trimmings. The roof is also shingled, and stained moss green. Dimensions: Front, 43 ft.; side, 32 ft., exclusive of piazza. Height of ceilings: Cellar, 7 ft; first story, 9 ft. 6 in; second, 9 ft.; third, 8 ft. 6 in. The interior presents a most perfect example for a modern dwelling-house. The interior view, shown in this illustration, gives a good vista of the hall and staircase and also the arcaded effect between hall and parlor. Parlor, hall, and dining-room are trimmed with oak. The former contains an open fireplace, built of Tiffany brick, with hearth of same, and a mantel made from a special design. The hall contains a very handsome staircase, lighted effectively by a delicate stained glass window, and an open fireplace, trimmed and fitted up in elegant manner. Dining-room is provided with a similar fireplace and mantel. The floors are laid with oak, and highly polished. Kitchen and pantries are trimmed, and wainscoted with white pine, finished natural. These apartments are furnished complete with all conveniences. The interior throughout is trimmed with whitewood. Hall and parlor are finished in cherry. The former is provided with an ornamental staircase, with newel posts extending to ceiling. The space between these newel posts is filled in with turned spindlework. This hall and stairway are lighted effectively by several windows glazed with stained glass. Parlor contains a bay window and an open fireplace, furnished with tiled hearths and facings, and a hardwood mantel with mirror. Dining-room is finished in oak, and it has a similar fireplace, and a china cabinet built in nook. Kitchen and pantries are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures complete. The second floor is finished in oak, and it contains four bedrooms, large closets and bathroom, the latter wainscoted and furnished replete. Third floor contains one bedroom and ample storage. Cemented cellar contains furnace and other necessary apartments. Cost, $4,600, complete. Mr. J. C. Sankins, architect and builder, Flatbush, Long Island.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT FLATBUSH, LONG ISLAND.

The engraving on page 44 shows a cottage recently erected for F. J. Lowrey, Esq., at Flatbush, Long Island. The design is unique, and the plan excellent. Underpinning, brick laid in red mortar. First story, clapboards. Second story, shingles. Painted Colonial yellow, with ivory white trimmings. Roof, shingled and painted red. Dimensions: Front, 3 ft. 6 in.; side 42 ft., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in; third, 8 ft.

"WYNDECOTE," A RESIDENCE AT SOUTHAMPTON, L. I.—See page 34.



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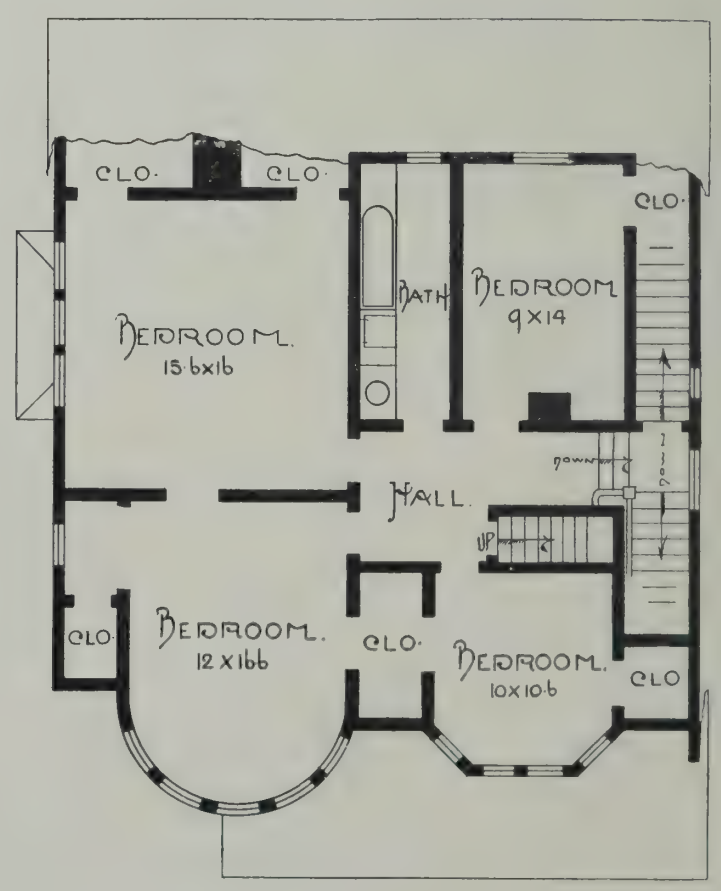
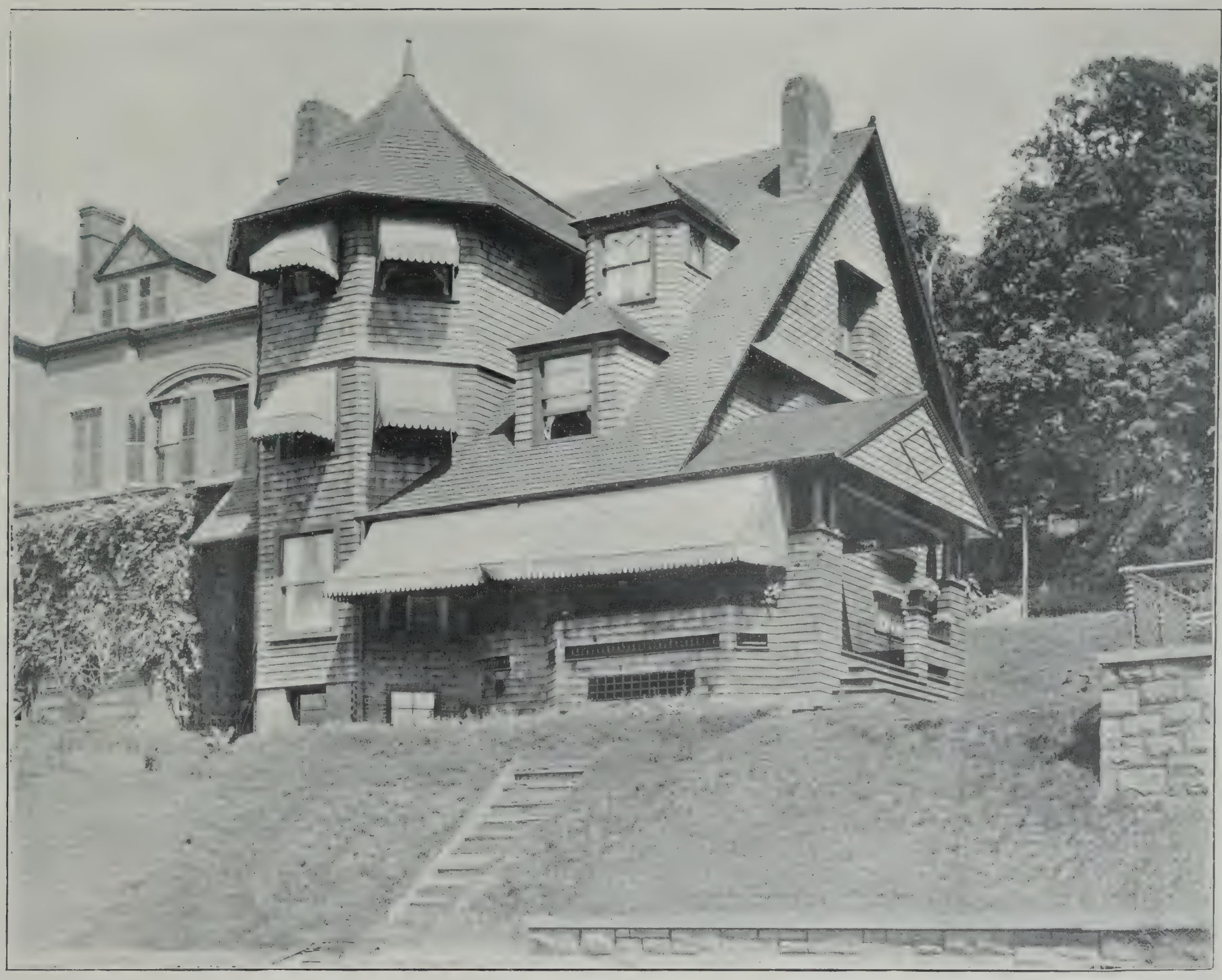
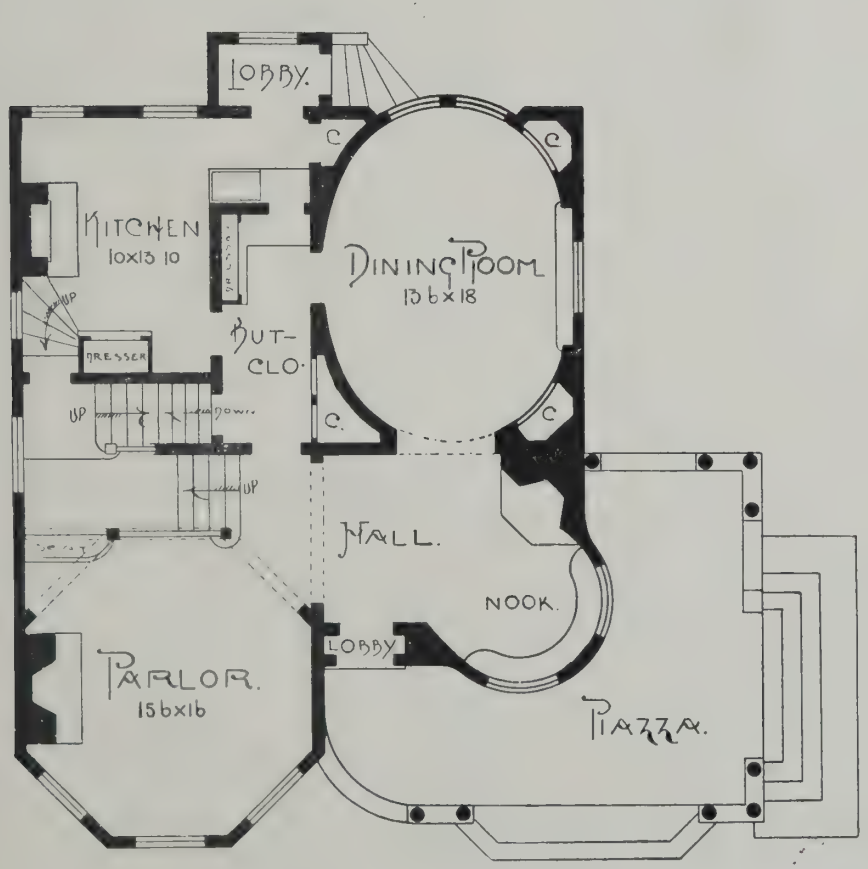


SECOND. FLOOR.

A COTTAGE AT ROGERS PARK, ILL.—See page 34.





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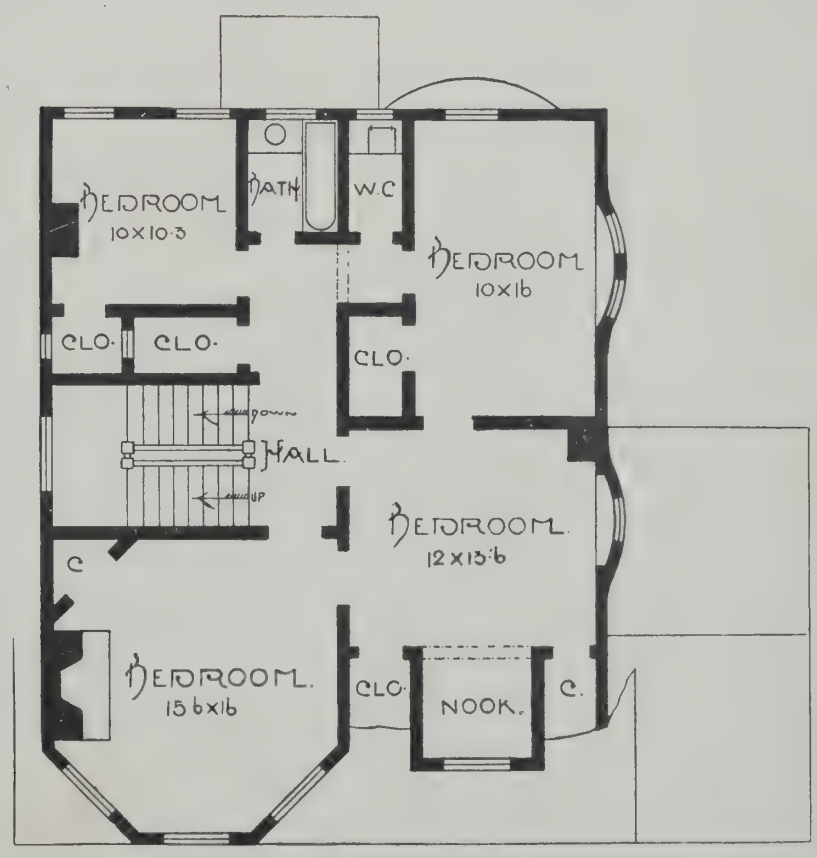

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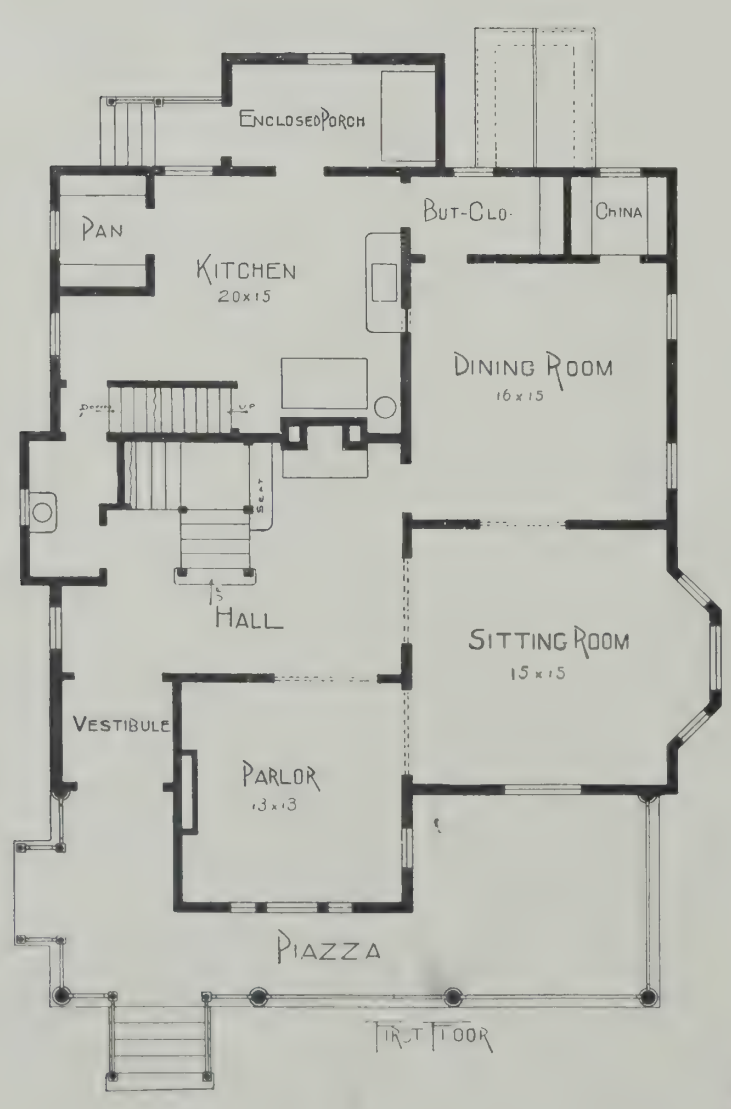
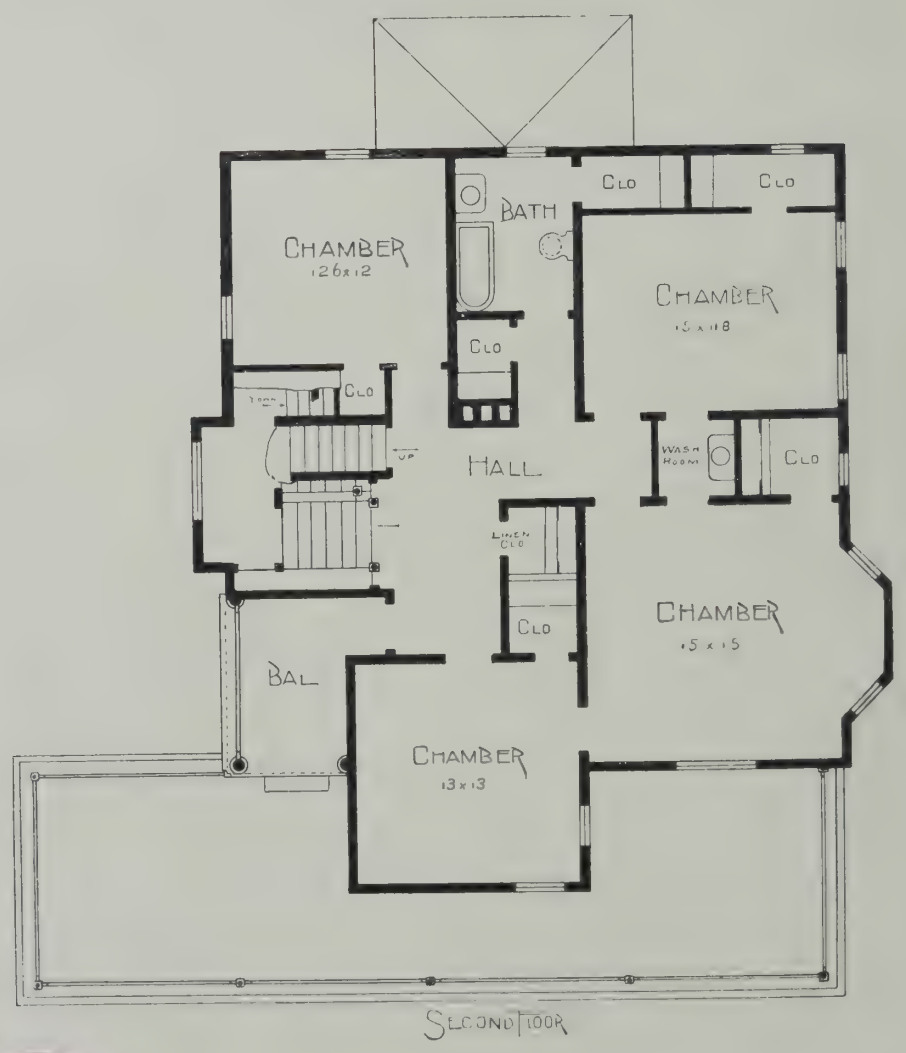
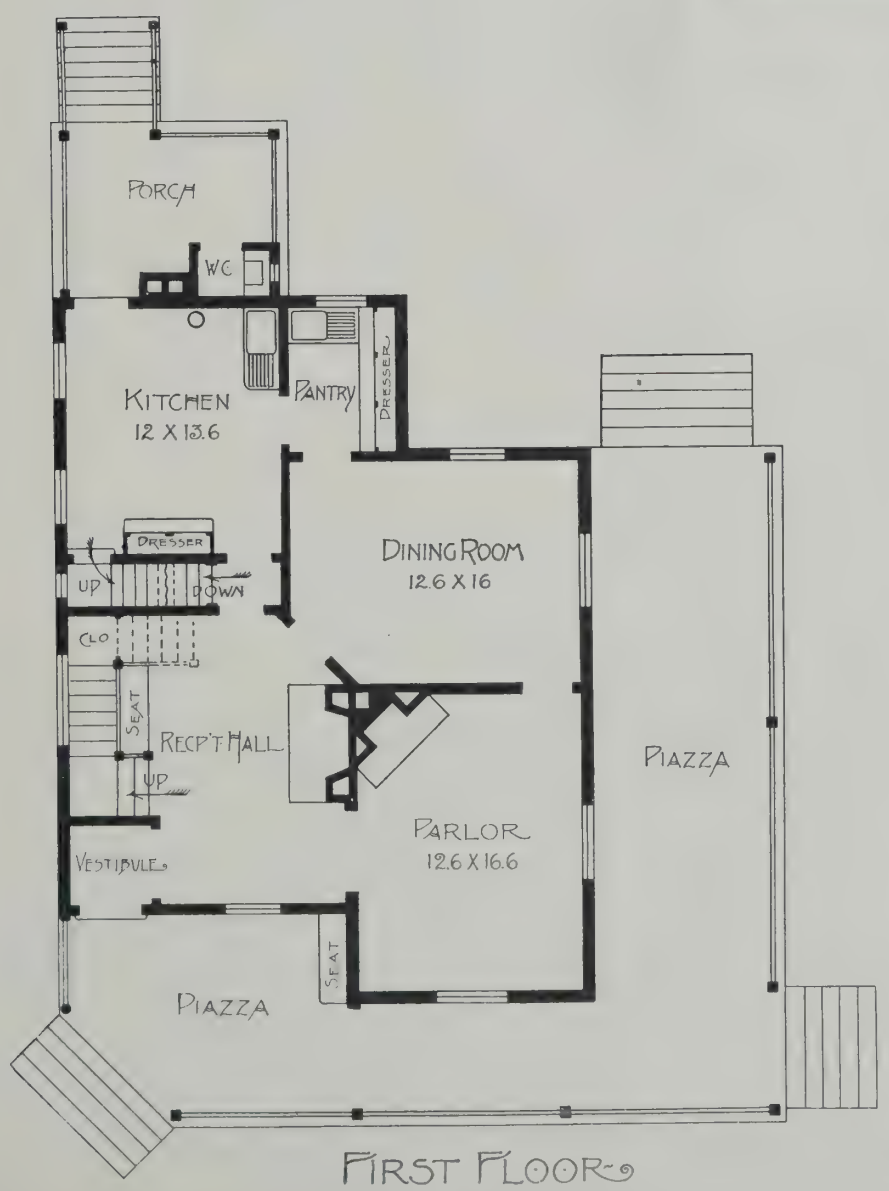
A RESIDENCE AT YONKERS, N. Y.—See page 45.





A RESIDENCE AT HINSDALE, ILL.—See page 45.



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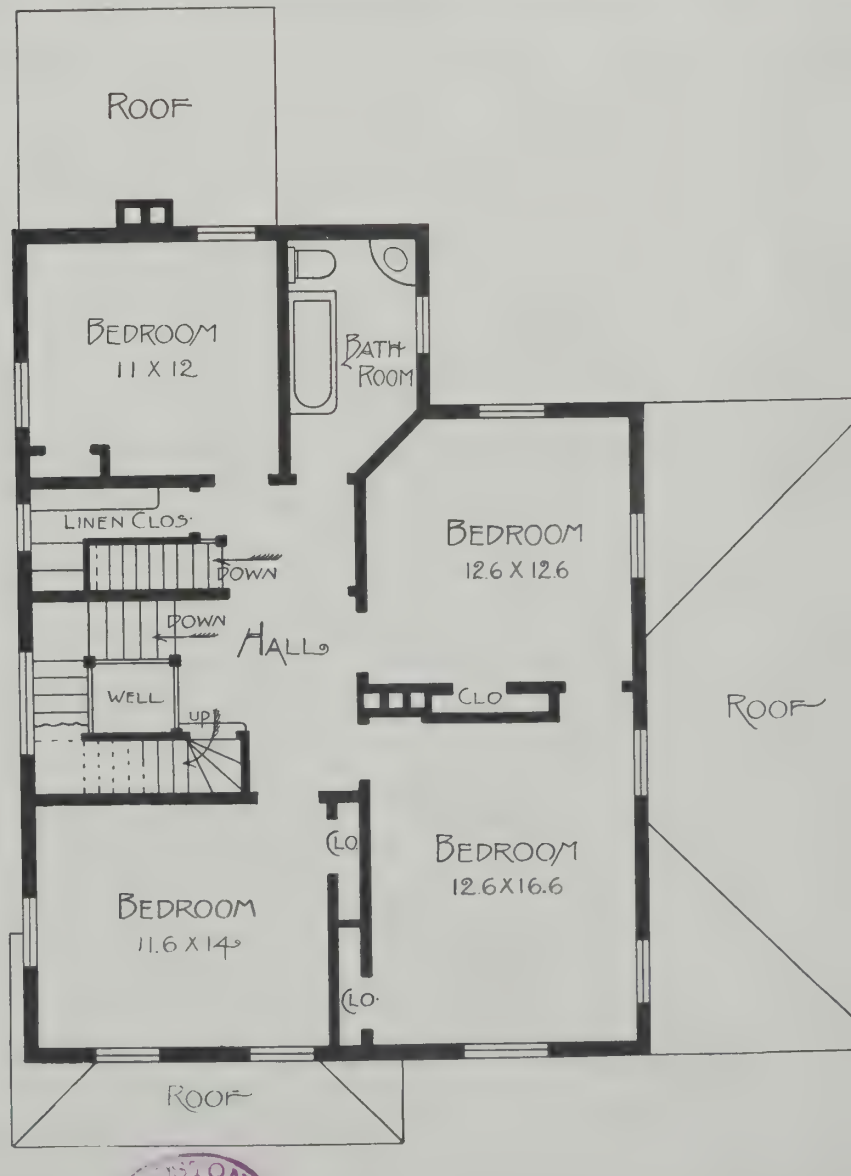

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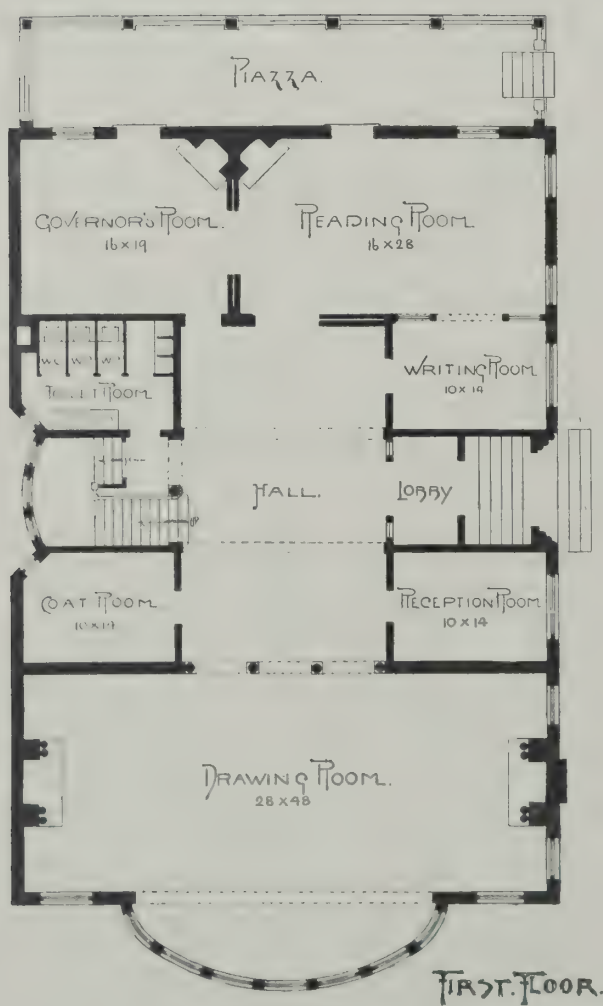
A RESIDENCE AT ROSEMONT, PA.—See page 34.



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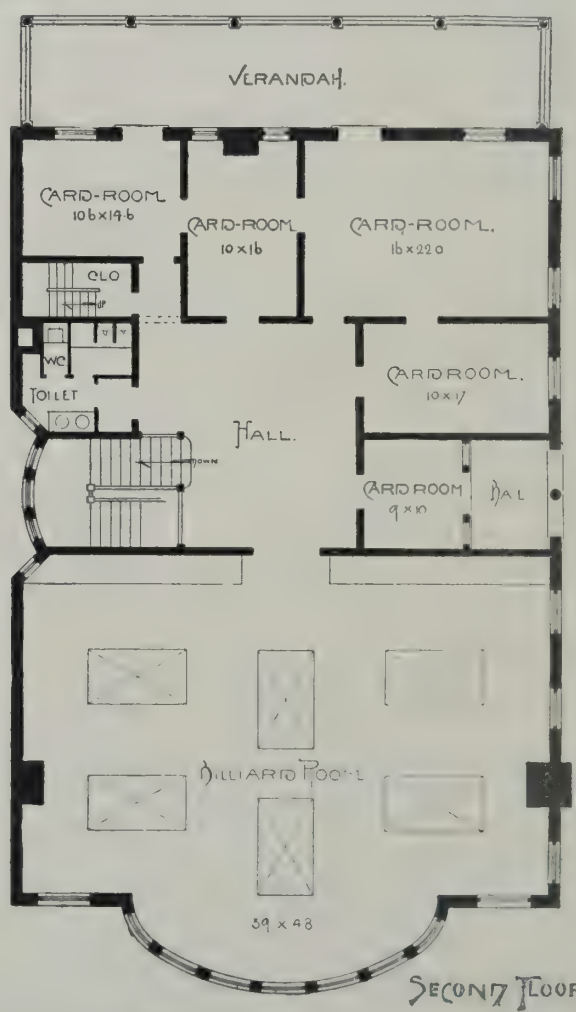
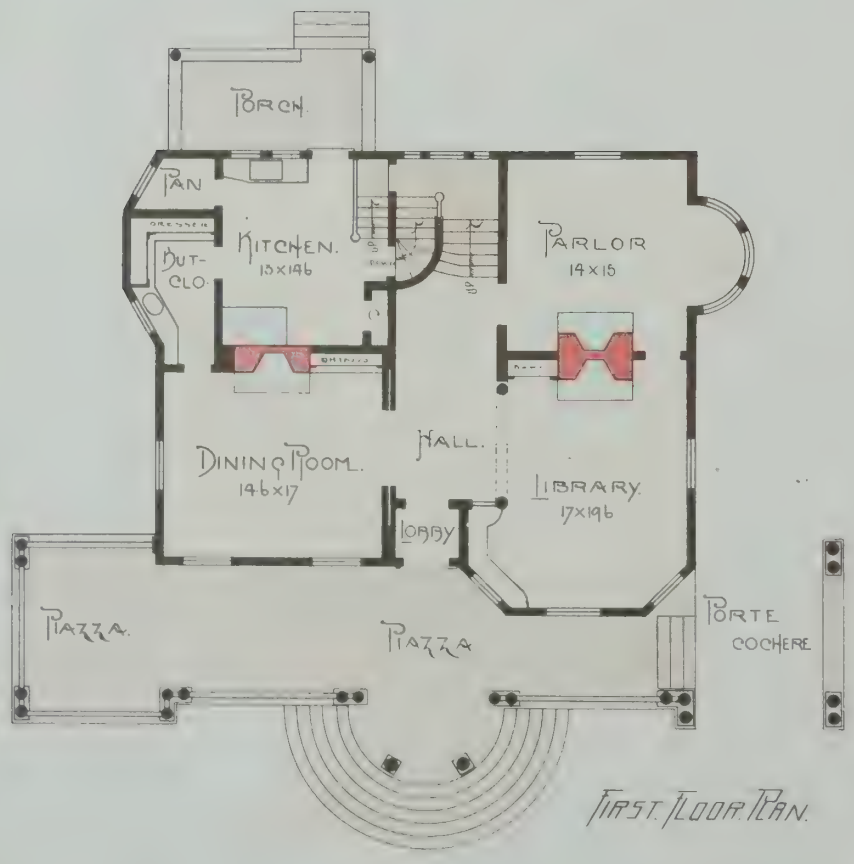


SECOND FLOOR.

SEA SIDE CLUB, BRIDGEPORT, CONN.—See page 45.

A COLONIAL RESIDENCE AT PORTCHESTER, N.Y.



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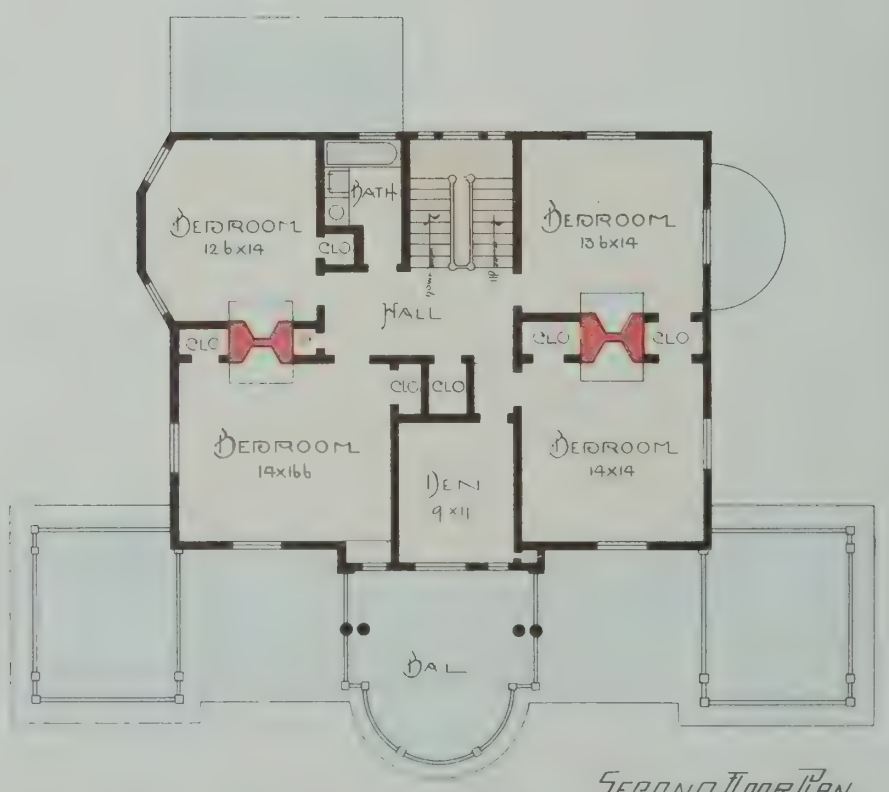
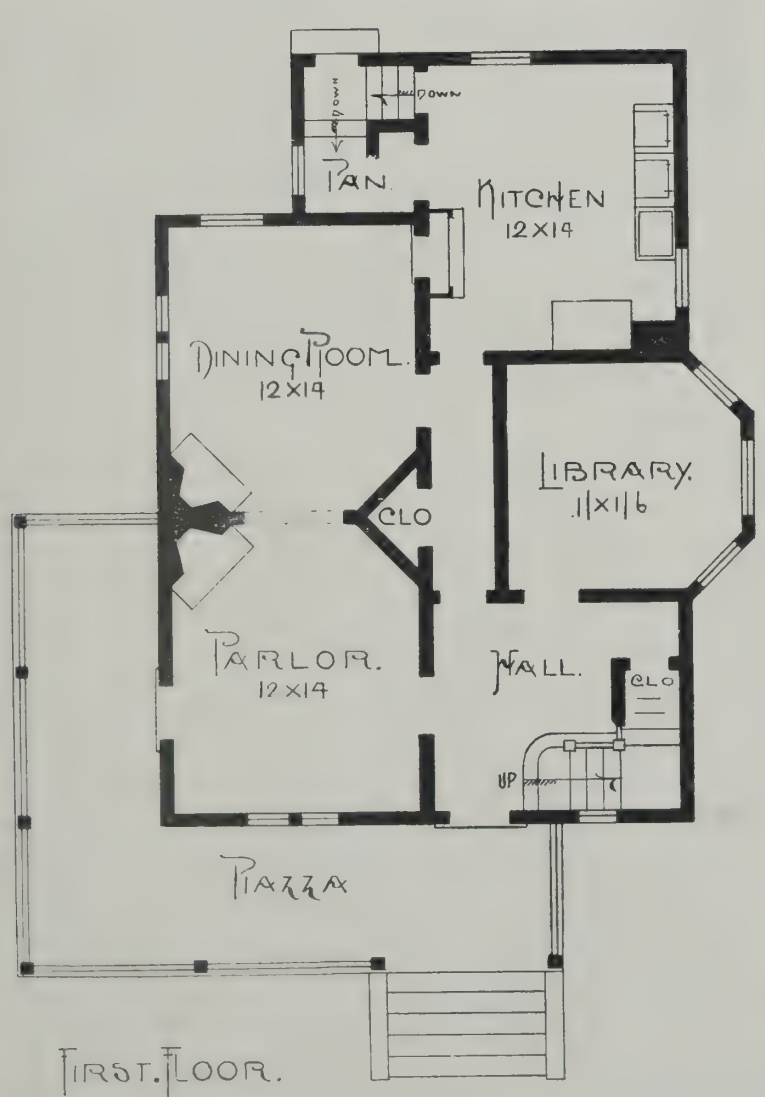


SECOND FLOOR PLAN.

WYNDECOTE- A RESIDENCE AT SOUTHAMPTON, L.I.

SCHUMACHER & ETTLINGER NEW



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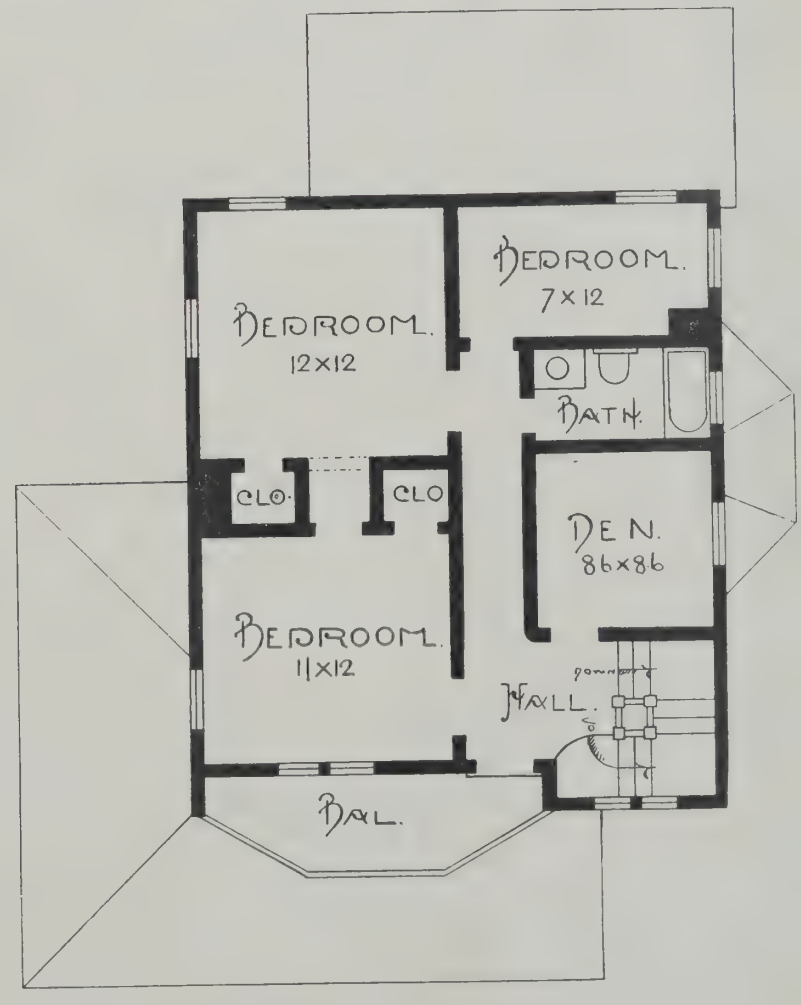
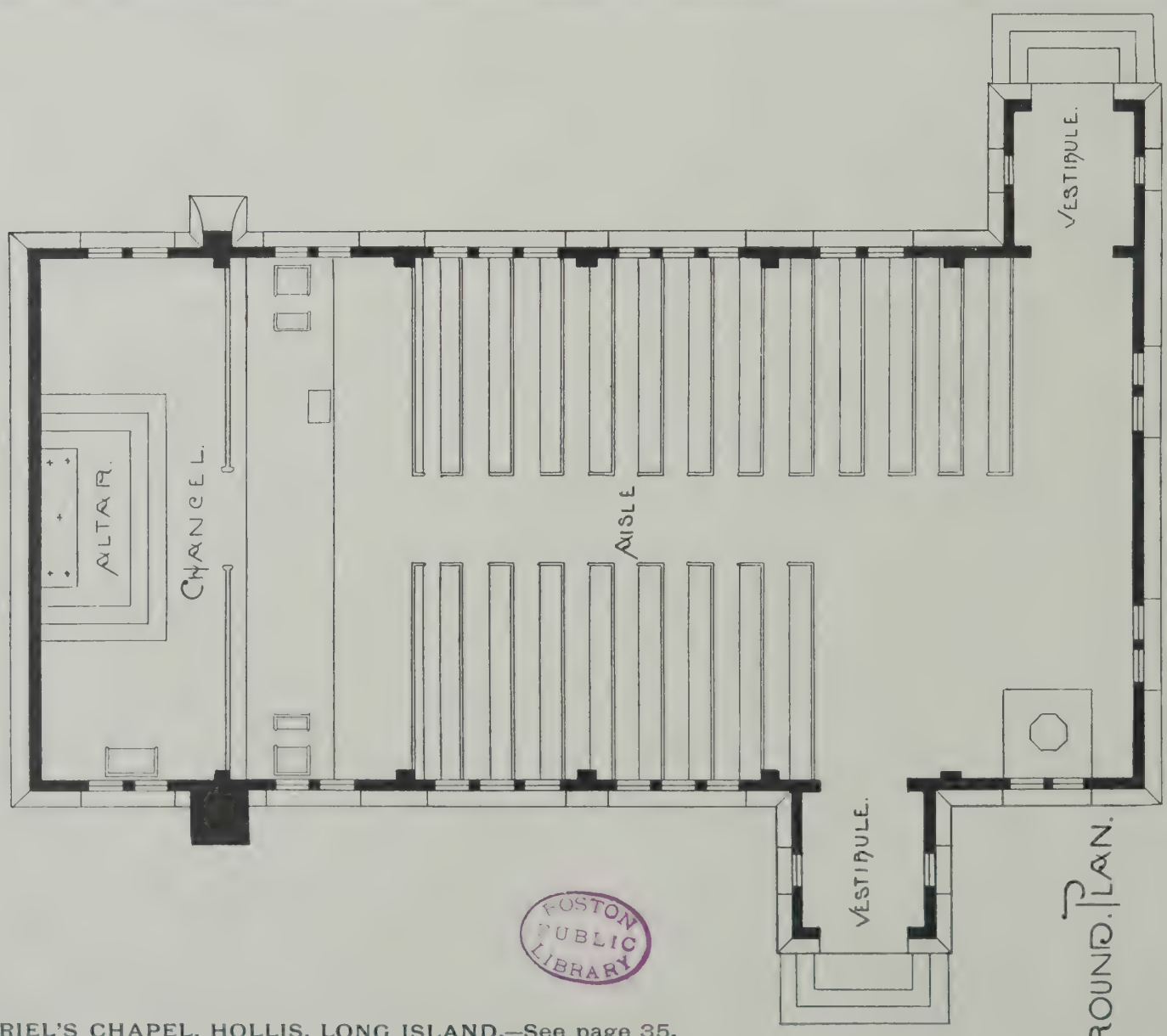
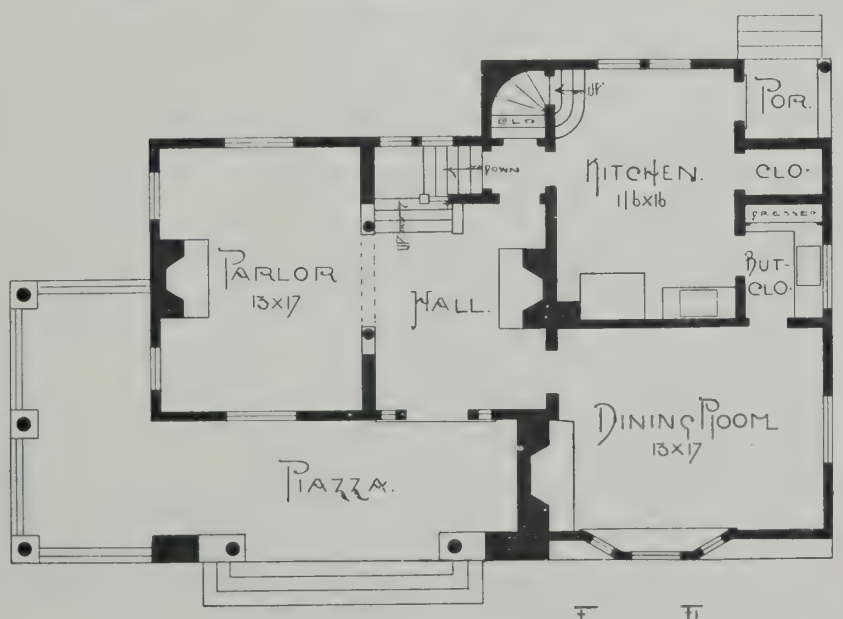


SECOND. FLOOR.

A COTTAGE AT HOLLIS, LONG ISLAND.—See page 35.



ST. GABRIEL'S CHAPEL, HOLLIS, LONG ISLAND.—See page 35.



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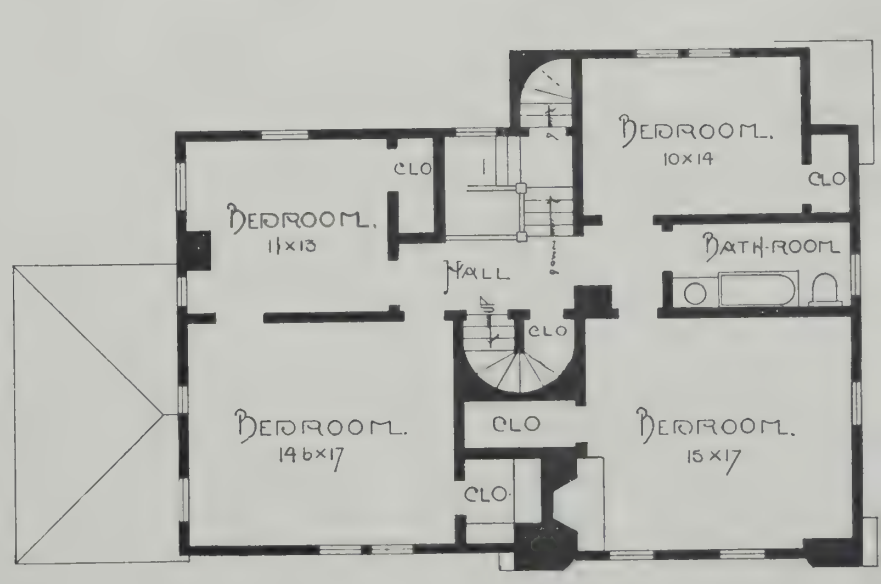

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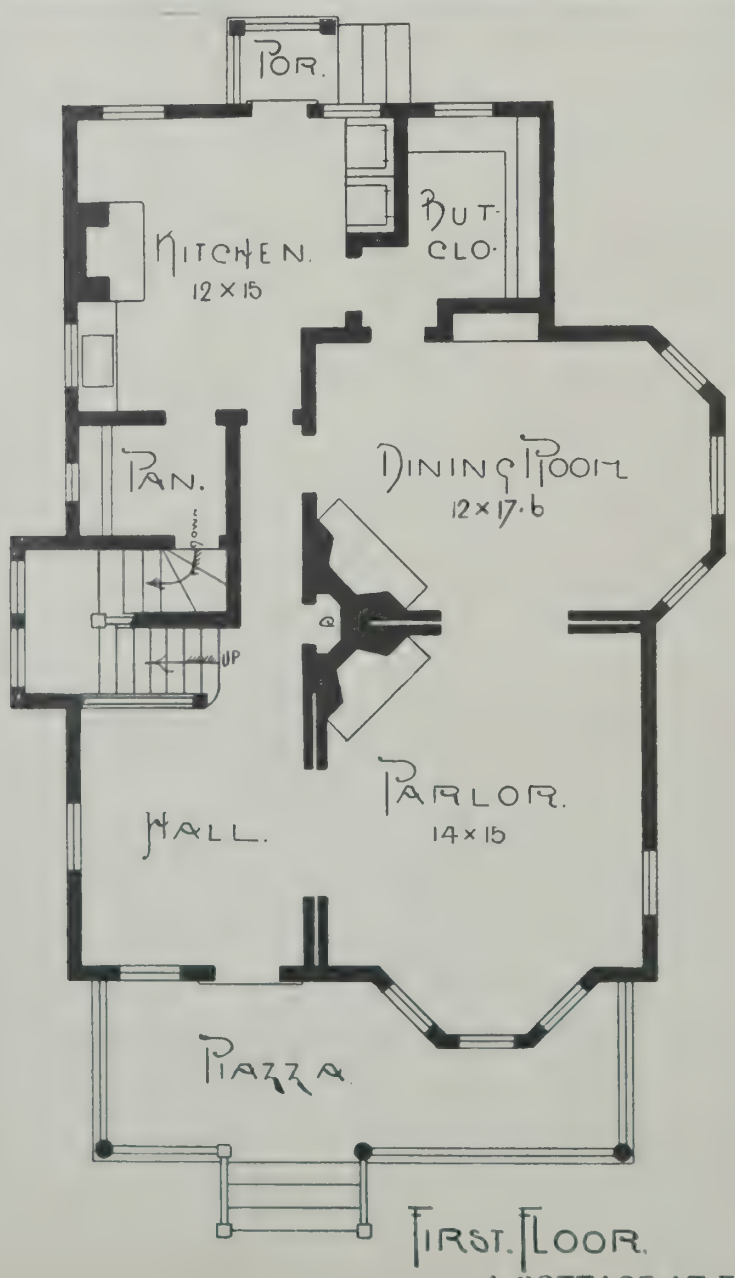
A RESIDENCE AT ORANGE, N. J.—See page 35.



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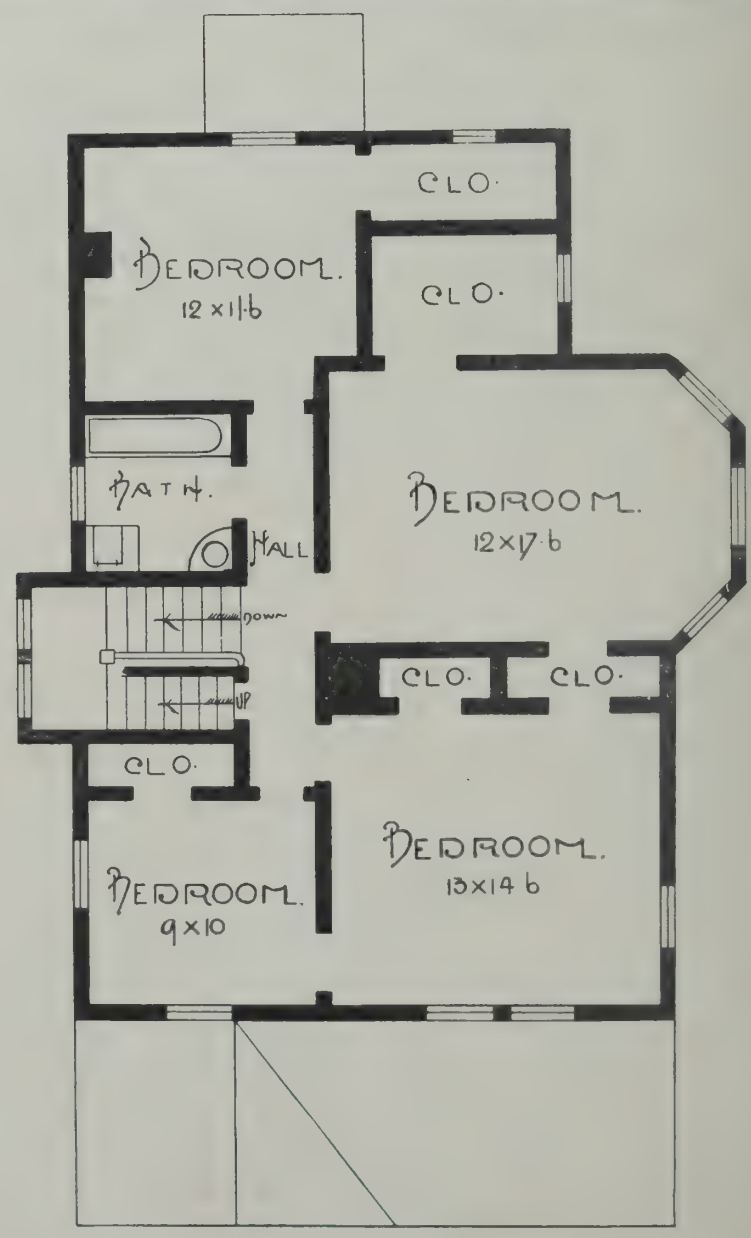


SECOND FLOOR.

A COTTAGE AT FLATBUSH, LONG ISLAND.—See page 35.

A RESIDENCE AT YONKERS, NEW YORK.

We present on page 37 a very unique design for a hill-side dwelling, recently completed for Mrs. Northrop, at Yonkers, New York. The design is pleasing and attractive, and it has a well shaded piazza, bay windows, and an octagonal projection at front, rising up three stories, and crowned with a bell-shaped tower roof. The underpinning is built of local brick, laid up in white mortar. The exterior framework above, of wood, is sheathed, and then shingled and stained mahogany color. The roof is shingled and painted red. Dimensions: Front, 31 ft. 6 in.; side, 39 ft., exclusive of front piazza and rear lobby. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft.; third, 8 ft. There is a cemented cellar under whole of building, containing a well fitted up laundry, furnace, and other necessary apartments. The arrangement of the various apartments on first floor is most excellent, and the several rooms, communicating as they do, present a pleasing vista of the entire suite immediately upon entering. The parlor and reception hall are separated by archways, provided with spindle transoms, and supported by columns with carved capitals. These apartments and dining-room are trimmed with ash. The floors are laid with yellow pine in narrow widths. The reception hall, spacious and well lighted, contains a paneled divan, fireplace built of Pompeian brick, with facings of same, hearth of stucco, brick and stone, and mantel of ash, and a broad, low staircase, with paneled seat and stained glass windows. The parlor, octagonal in form, contains a fireplace built of Pompeian brick, with hearth and facings of same, and it is provided with an ornamental mantel of ash. An unusual feature is introduced in forming the dining-room, as shown by the plans presented herewith. Every bit of space is utilized, and there are two china cabinets provided in either corner, with drawers and cupboards above, with ornamental glass doors. The buffet is also built in, and provided with a stained glass window. Butler's pantry and kitchen are trimmed and wainscoted with yellow pine, finished natural, and furnished with the usual fixtures complete. The second and third floors are trimmed with pine, and treated in colors, with the exception of a few apartments finished natural. The second floor contains four bedrooms, six closets, and bathroom, and the third floor contains a studio, two bedrooms, and trunk room. Bathroom is wainscoted and fitted up replete. J. B. Snook & Sons, architects, No. 12 Chambers Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

SEA SIDE CLUB, BRIDGEPORT, CONN.

On page 40 we present views of this clubhouse, which is a good example of Romanesque style. The exterior of the building to the top of water table is of rock faced Portland brown sandstone. The superstructure above is built of buff brick, with trimmings of similar stone. The front entrance is flanked on either side by a cluster of columns with carved capitals. The roof is covered with octagonal cut slate. Dimensions: Front, 80 ft.; side, 50 ft., not including piazza. Height of ceilings: Cellar, 9 ft.; first story, 12 ft.; second, 12 ft.; third, 9 ft. The main entrance hall and stairway is one of the special features, and very effective. It is trimmed with antique oak. The walls, to a height of ten feet, are paneled, and the ceiling is heavily beamed. The staircase, wide and imposing, is provided with a carved newel post, extending to ceiling. This staircase is lighted by a cluster of leaded windows, glazed with delicate-tinted glass. The floor is laid in tiled mosaic. This hall is separated from drawing-room by several columns with Corinthian capitals, with good effect. The reception-room is conveniently located, and is finished in a delicate manner. Drawing-room, occupying the whole of the north end of the building, contains a spacious bay window, and two large, open fireplaces, furnished with tiles, wrought iron trimmings, and elegant carved mantels, with columns and mirrors. This drawing-room and the remainder of the building are trimmed with antique oak. Writing and reading rooms are divided by an archway provided with columns supporting a spindle transom. The latter and governor's room have open fireplaces, furnished similar to the ones already described. The office, or coat-room, and toilet are placed on either side of stairway, are well ventilated with outside open air, and are fitted up complete. The second floor contains billiard-room, five card-rooms and toilet. The billiard-room is spacious, well lighted and ventilated, and a raised platform is provided at one end of room. The floor is of hardwood, laid in narrow widths. The card-rooms are arranged for one or several sets. A private stairway leads to third floor, containing the servants' quarters. Cemented cellar contains furnace and ample storage. The furnishing of the clubhouse was committed to the care of Henry Atwater, Nathaniel Wheeler, and John Rusling, and the taste, skill, and judgment they displayed have never ceased to call forth unqualified praise. Messrs. Longstaff & Hurd, Sanford Building, Bridgeport, Conn., were the architects, they having won in competition.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT HINSDALE, ILL.

On page 38 we illustrate the residence of C. E. Raymond, Esq., recently erected at Hinsdale, Ill. Architect, J. S. Shannon, of same place. The house has parquetry floors in upper and lower halls, dining-room, and chamber over sitting-room, steam heat plant, gas machine, etc. Total cost of house, including mantels and grate, hot water heat, gas machine, first-class plumbing throughout, heater, etc., $7,000. The colors of the exterior are Colonial yellow, with white trimmings. Interior: Dining-room, sitting-room, hall, and stairway, in oak; upper floor, pine, natural finish. Furnished with porcelain bath-tub, Italian marble lavatory, nickelplated trimming, etc.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

THE IRRIGATION OF LAWNS.

Among the surroundings of a country dwelling, perhaps nothing adds so much to its rural charms as a green and flourishing lawn. The eye ever rests upon it with delight; and if there are extended prospects, the lawn lends beauty to the scene.

In order to preserve a lawn in freshness during the parching days of summer, the grass must be repeatedly watered; and if the lawn is of much extent, this work of irrigation is no easy job. A common method is to have a hollow standard provided at its top with a rotary perforated head. This, when connected with the supply hose, throws a gentle rain over a considerable space; after which the standard is moved into a new position and another part of the lawn is watered, and so on. The time and attention of one or more men, according to the size of the lawn, are required for this duty.

The object of the present invention is to effect the instantaneous irrigation of every part of the lawn, at any time desired, without the interposition of a special attendant, such irrigation being effected by simply turning the water faucet, which any member of a household may do.

Fig. 1.—FOUNTAIN PIPES FOR LAWN IRRIGATION.

For this purpose the usual lawn hose is employed, which is divided into various sections, the ends of which are connected to a series of short fountain pipes, as shown in our engraving, Fig. 1. In Fig. 2 is seen an enlarged view of one of these fountain pipes. They may be made of copper for durability, but a cheaper material is tin, and it answers very well. One side of the pipe is provided with an ear, through which passes a long pin, by which the fountain pipe is fastened to the ground. The central part of the fountain pipe is enlarged, as shown, and is perforated with fine holes, so that the escaping water from the several fountain pipes will issue in the form of fine showers, as shown in Fig. 1.

In practical use the hose, furnished with the fountain pipes, is laid throughout the lawn, and the pipe pins are

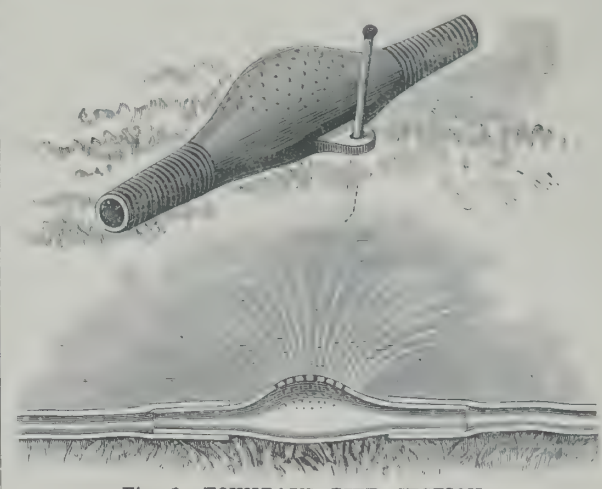


Fig. 2.—FOUNTAIN PIPE SECTION.

driven down to hold the fountain pipes in proper position. The water valve is then opened, when the entire lawn will be thoroughly and quickly showered. The hose and fountain pipes may be left in position upon the lawn throughout the season, and the lawn may be irrigated whenever desired, simply by turning the supply faucet.

THE CASTLE OF BONNETABLE.

In Sarthe, at some distance from Mamers, and upon the railway that connects the latter with Saint Calais, stands, in the small city of Bonnetable, the castle built in 1742 by the architect Mathurin de Landelles, upon the site of a former castle erected in the twelfth century by the lords of Montfort l'Amaury. An edifice often loses all unity and all charm in the successive alterations of which it is the object. It is with it as it is with those coins which, having been passed from hand to hand for several generations, become smooth to the touch; the relief has disappeared.

Bonnetable has fortunately been preserved from so lamentable a fate. From the D'Harcourt family, which, in the thirteenth century, entered into possession of the fief, and one of the members of which, Jean d'Harcourt, had undertaken the construction of it, it passed into the hands of the Bourbon family, and then into those of the De Luynes family. In 1788 it came into the possession of Duke Mathieu de Montmorency. At present it belongs to Duke de la Rochefoucauld Doudeanville, who, in recent years, has had it restored by two Parisian architects, Messrs. Henri and Louis Parent.

The first castle, the one at least that Mathurin de Landelles constructed, includes two façades of analogous dimensions. The principal façade, flanked at its extremities by huge cylindrical towers, crowned by a projecting *chemin de ronde* which is prolonged upon the entire façade, and covered with a conical slate roof, has the aspect of the entrance of a fortified castle. It is pierced in its centre by a great ogival dome contrived in the base of a square donjon of quite feeble height, above which rises a pyramidal roof, surmounted by a light woodwork belfry. To the right and left of the entrance, protected by a drawbridge and closed by a portcullis, there are two towers smaller than the corner ones, and also cylindrical and covered by the same pepper-box-like roof. The rest of the façade is composed of a high ground floor, lighted by large, square battlemented windows, the upper part of which is ornamented with the traditional curved lines. Above the ground floor is the first story, the windows of which, starting from the base of the *chemin de ronde*, and surmounted by high gable ends, rise to the ridge of the roof.

These windows, identical as to form with the windows of the ground floor, are the only ornamented part of the edifice. Their ornamentation, entirely Gothic, is, moreover, of the simplest nature. It is, nevertheless, in most

exquisite taste. Their triangular tympan has a grand appearance under their framing of crocketed gables, surmounted by a flower at the point and bordered with symbolical animals at the base.

The decoration is the same for the lateral façade, which, like the principal one, is flanked by a huge corner tower, and, like it, bathed in a wide basin. But while the principal façade has, without any modifications, preserved its severe aspect of former times, the lateral façade has, during the course of the last work of restoration, undergone a few modifications designed to render it more habitable. The windows of the corner towers have been provided at the base with elegant little balconies, supported by sculptured brackets and provided with openwork balustrades. In the space comprised between the towers the rigidity of the straight line is broken by two bay windows with six sides—a sort of projecting turrets containing large windows, but which do not exceed the height of the ground floor, and the upper part of which forms an embattled terrace, upon which, in guise of balcony, open the windows of the first story. This is the façade that is represented in our engraving.

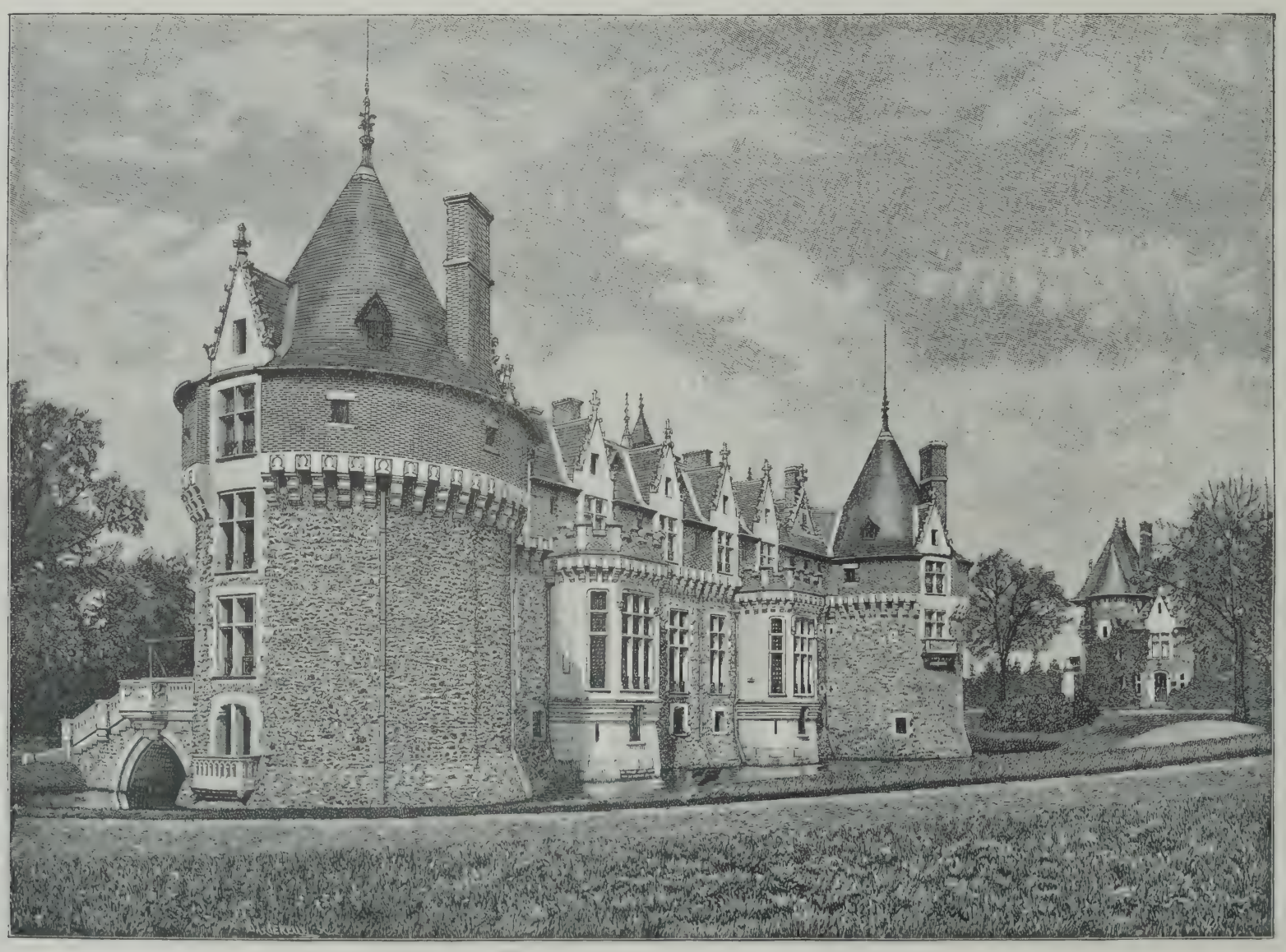
So much for the primitive part. As the castle in this form was not sufficient for a large family and for a *personnel* still more numerous, some enlargements became necessary. It became a question of constructing the destroyed wings of the castle constructed by the lords of Montfort l'Amaury, presents the aspect of a donjon, which is connected wonderfully well with the rest of the edifice. At the point of connection of the corner tower and the new donjon the architects have constructed a chapel, whose apsis projects over the basin.

Such is the castle in its present state. But the description would be forcedly incomplete did we not speak of the inclosing wall, which extends in front of the principal façade of the castle, upon the street (for the property is situated in mid-city), and the construction of which, very ingeniously combined, does the greatest honor to the Messrs. Parent. It is an embattled wall, in which, opposite the postern of the castle, opens a latticework gate flanked by high masonry pillars. Let us add that, although the castle has preserved none of its ancient furniture, the internal arrangement has not been sensibly modified. One feels that the present arrangements have been made by the Duke de la Rochefoucauld and his architects with a religious respect for the past. They cannot be too highly felicitated.—*Magasin Pittoresque.*

VIADUCT IN EDEN PARK, CINCINNATI, FOR STREET RAILWAY CARS.

VIADUCT FOR STREET RAILWAYS, CINCINNATI.

The business portion of Cincinnati occupies a plateau nearly three miles wide, rising abruptly about eighty feet on the north side of the Ohio River, and beyond this is an irregular line of bluffs, some 400 feet high, over and beyond which the city has spread. One of these hills is known as Mount Adams, and our illustration represents a view on the Mount Adams and Eden Park Railway, forming part of the street railway system of Cincinnati, the park being on a hill in the eastern part of the city, and containing two hundred acres. The heights are all reached by inclined planes, cable roads, and in some instances by electric lines. There are six inclined planes, on four of which the electric cars are transferred from one level to the other and continue their course, the planes being provided with triangular shaped trucks with platforms on a level, so that the electric cars are readily run on or off at the terminals. In the Cincinnati electric roads the double trolley is employed, both arms of the circuit being thus more equally balanced than with a track return, and the necessity of tearing up the streets is avoided, while the possibility of destruction of water and gas pipes by electrolytic action is entirely removed. The cars are also provided with electric heaters, and the closed cars have vestibules at the rear end, with an opening at one side. We are indebted for our illustration to the *Street Railway Journal*, New York.



THE CASTLE OF BONNETABLE.

Wood, if saturated with tungstate of soda, is rendered non-inflammable.

The slow-burning construction of mills and other buildings is now strongly advocated. One feature thereof is the use of four-inch planks in the floors, which delays the spread of flames, and gives time to bring up the fire apparatus.

THE FIREPROOF BUILDING CONSTRUCTION OF THE NEW JERSEY WIRE CLOTH COMPANY.

Fireproof building construction, as usually executed, involves the use of a very heavy mass of material. By this weight nothing is really gained, and the building has to be made of additional strength to support the fireproof elements. Another feature of such construction is, if we may so express it, the inflexibility of the materials used, which do not lend themselves to any variety of design for special cases. Everything has to be fixed before the materials leave the factory. In the cut accompanying this article we present the fireproof method of construction introduced by the New Jersey Wire Cloth Co., of Trenton, N. J., methods which are now being employed to great advantage in the new Broad Street station of the Pennsylvania Railroad, in Philadelphia, Pa. Our illustrations represent principally the work actually executed in that building, and show how admirably the system lends itself to ornate and massive design.

Figs. 1, 2, and 3 show floor and ceiling construction. A curved piece of wire cloth, stiffened by transverse and longitudinal ribs of light iron rod, spans the interval between two wall beams. On the wire cloth thus established cement concrete is deposited and hardens, giving a floor of very great strength, and far lighter than the usual construction. The ceiling may be treated in several ways. In Fig. 1 the flat ceiling is shown, on which a flat sheet of wire cloth is supported by tension rods extending from I beam to I beam, which rods are stiffened by suspending wires running from the arch above them. The wire cloth is fastened to the supporting rods by short pieces of wire, and its surface is plastered, giving a flush ceiling. Fig. 2 shows an arch plastering, where the flat sheet of wire gauze is dispensed with, and a ceiling, consisting of a series of arches, results.

In Fig. 3 a modification of the design is shown, in which an angle iron, running longitudinally and suspended rigidly from the arch above, is used to support laced thereto, a framework is produced for plastering by which the heavy double ceiling beam is produced, whose massive effect is so well rendered in the cut.

In Fig. 6 is shown round and square column work, the wire gauze with cross section rods and longitudinal rods being studded off from the iron column by special clips. The large columns of Fig. 5 are built up from the iron core by the methods illustrated in this cut.

Fig. 7 shows a construction of a heavy cornice, where is shown in detail the use of the cross section rod or profile piece. It is made of light iron, bent by hand, and in the building, on a shaping plate to the desired outline. It takes but a few seconds to make one of these profile pieces. They are held in place by clamps attached to the beams and by suspension pieces. Longitudinal rods are fastened to their angles; on this framework wire gauze is placed, and all is then ready for the plaster, which in part of the cut is shown applied.

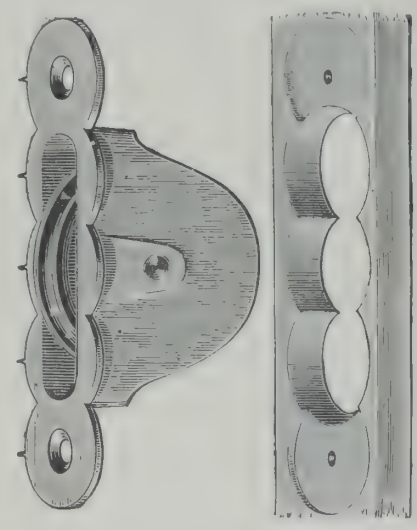
Another interesting feature of the work appears in this cut, which is its adaptability to electric light work. At the desired intervals in the cove of the cornice holes are cut, through which wires for lamps are laid. Back of the wire cloth is ample room for the cables. This square board shown in the cut serves for the attachment of the lamp socket. It is entirely concealed by the application of the plaster. In the cut of the materials are shown the sections generally employed, which, it will be observed, are of ordinary merchant iron. The Pennsylvania station presented an admirable field for the system, and its capabilities have been taken full advantage of by the architect.

Silvester's Remedy against Dampness.

The process consists in using two washes or solutions for covering the surface of the walls—one composed of Castile soap and water, and one of alum and water. The proportions are three-quarters of a pound of soap to one gallon of water, and half a pound of alum to four gallons of water, both substances to be perfectly dissolved in water before being used. The walls should be perfectly clean and dry, and the temperature of the air not above 50 degrees Fahr. when the compositions are applied. The first, or soap, wash should be laid on when boiling hot, with a flat brush, taking care to form a froth on the brickwork. This wash should remain twenty-four hours, so as to become dry and hard before the second, or alum, wash is applied, which should be done in the same manner as the first. The temperature of this wash, when applied, may be 60 or 70 degrees Fahr., and this also should remain twenty-four hours before a second coat of the soap wash is put on. These coats are to be applied alternately until the walls are made impervious to water. The alum and soap thus combined form an insoluble compound, says *Architect and Building*, filling the pores of the masonry and entirely preventing the water from entering the wall.

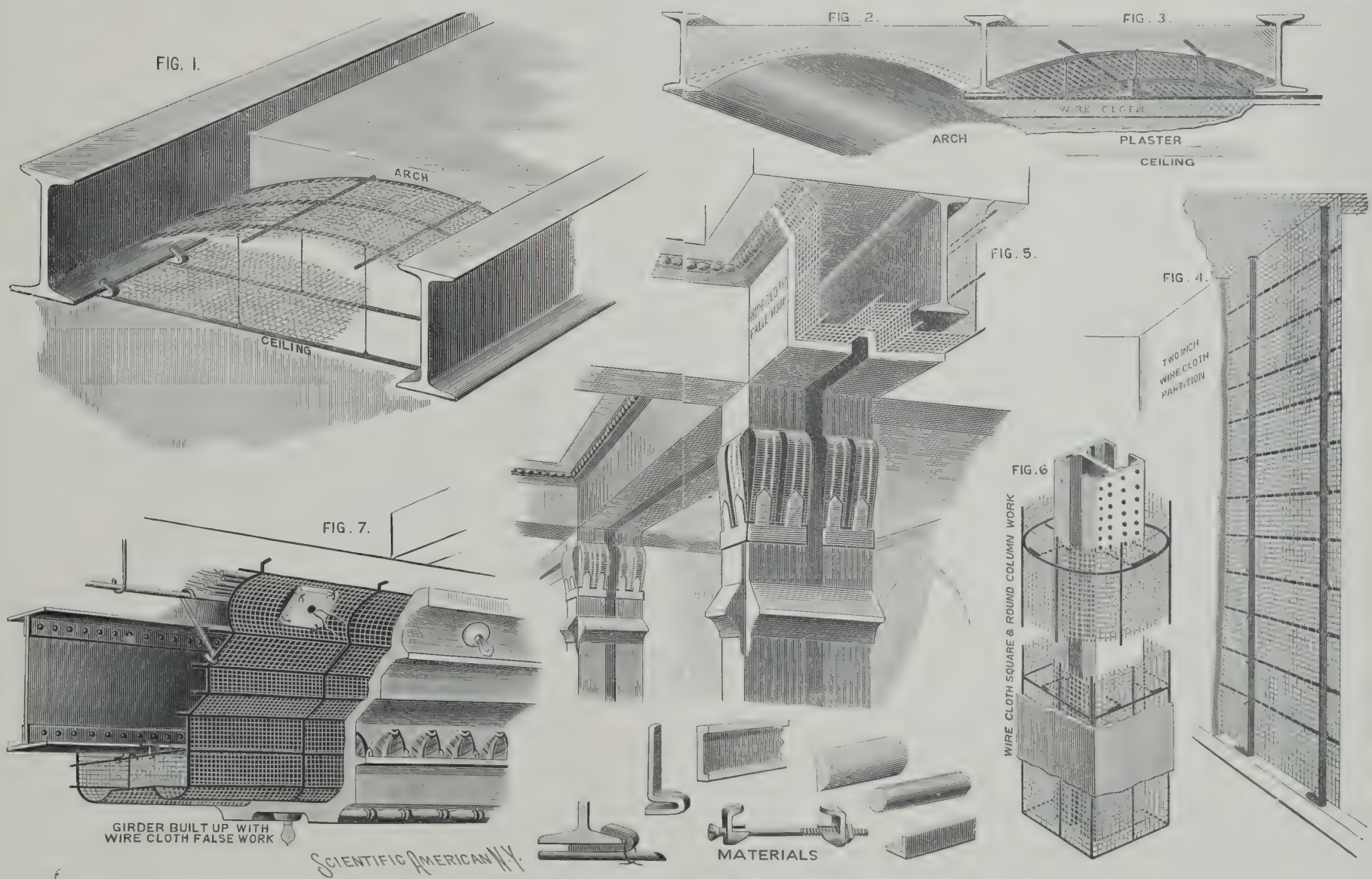
PALMER'S "COMMON SENSE" FRAME PULLEY.

This pulley, manufactured by Palmer Hardware Manufacturing Co., 622 Second avenue, Troy, N. Y., was put on the market several years ago. Since that time it has been improved by the addition of marking spurs on one edge of the face plate, by means of which the hole centres are instantly and accurately located for boring the mortise. The manufacturers call attention



to the following points: 1st. It is the only auger mortise pulley with a face plate combining the feature of "each pulley its own marking gauge." 2d. The case is made in one casting, which gives it a good appearance, and greatly adds to its strength, avoiding liability of breakage in shipping or driving into its mortise. 3d. The wheel revolves on a large steel pin and has full half inch bearing. It is made in a first-class manner.

THE Eureka wall plaster and white and gray finishes are designed to save time and labor. The plaster is dry, of the best quality of material, mixed by machinery, and is shipped in bags, ready for use, by simply mixing with water. But two coats are used for first-class work. It is elastic, yet hard and tough, and will not break or dent with an ordinary jam or blow from furniture, and it will not crumble or sift where nails are driven in. It permits of any style of finish or decoration desired. It is made by the Eureka Plaster Company, of Syracuse, N. Y., to whom builders should apply for catalogue of directions and further particulars.



THE FIREPROOF BUILDING CONSTRUCTION OF THE NEW JERSEY WIRE CLOTH COMPANY.

SCIENTISTS are now telling us that the dangerous microbe is lurking in the greenback. Those in arrears for subscription, says a contemporary, can send the money, as the publisher has facilities to disinfect small amounts, and is willing to take the risk.

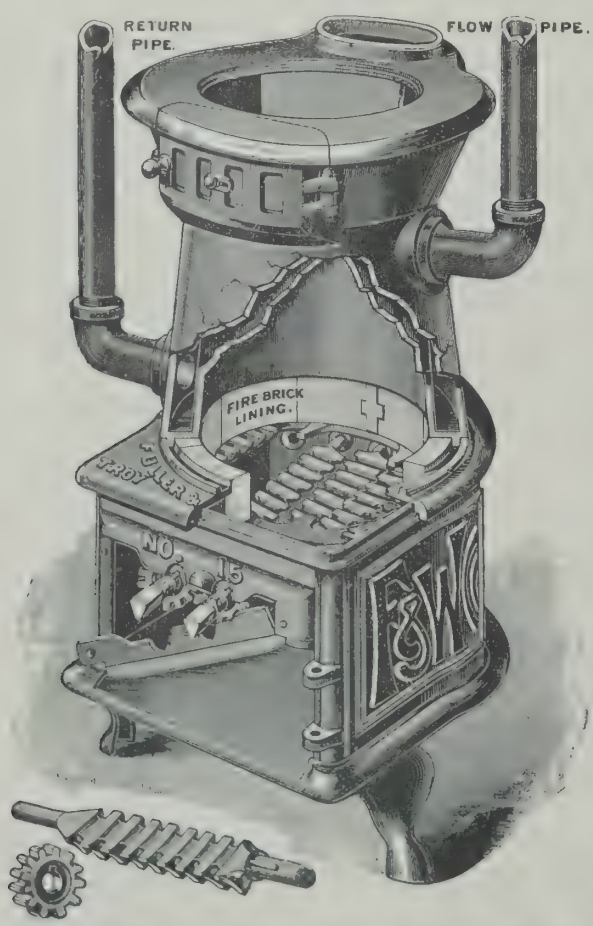
THE "OLD HICKORY CHAIR."

The Old Hickory Chair Co., of 32 West South St., Indianapolis, Ind., manufacture genuine "Old Hickory" chairs for homes, hotels, verandas, lawn and offices, etc., a representation of a rocker of this style of furniture being shown herewith. The posts are made of partly green wood, with the bark on, and when set up the bark shrinks down on the well seasoned stretches, making the chair

doubly strong. The seats and backs are nicely woven on the best inner hickory bark, which is exceedingly elastic, strong and durable, and adapted to stand the rain and sunshine of any clime for many years. The chairs are very comfortable, are sold at a low price, and have a beautiful rustic appearance.

AN IMPROVED HOT WATER HEATER.

The Fuller & Warren Company, at their extensive foundry and shops at Troy, N. Y., produce a full line of hot water and combination warm air and hot water heaters, as well as about the largest variety of stoves, furnaces, and ranges that ever had their origin in one establishment, for the firm dates back to very nearly the commencement of the manufacture of stoves as a business. The accompanying illustration represents a low-priced, powerful hot water heater, recently designed and introduced by this company. The water section is cast in one piece, doing away with all joints, packing, etc., and insuring durability, and the flue construction at the top is so arranged that the products of combustion impinge directly upon all points of the boiler proper before passing to the exit pipe. The fire is completely surrounded by water surface. There is an easily operated triangular grate, and the draught may be regulated by a cord or chain from an upper room. The firebrick lining is four inches high, and the brick may be conveniently taken out without disturbing the grate or frame, the



THE FULLER & WARREN HOT WATER HEATER.

grate being also easily removed. There are no places where ashes and soot are likely to collect, no flues to be cleaned, and the construction throughout is extremely simple.

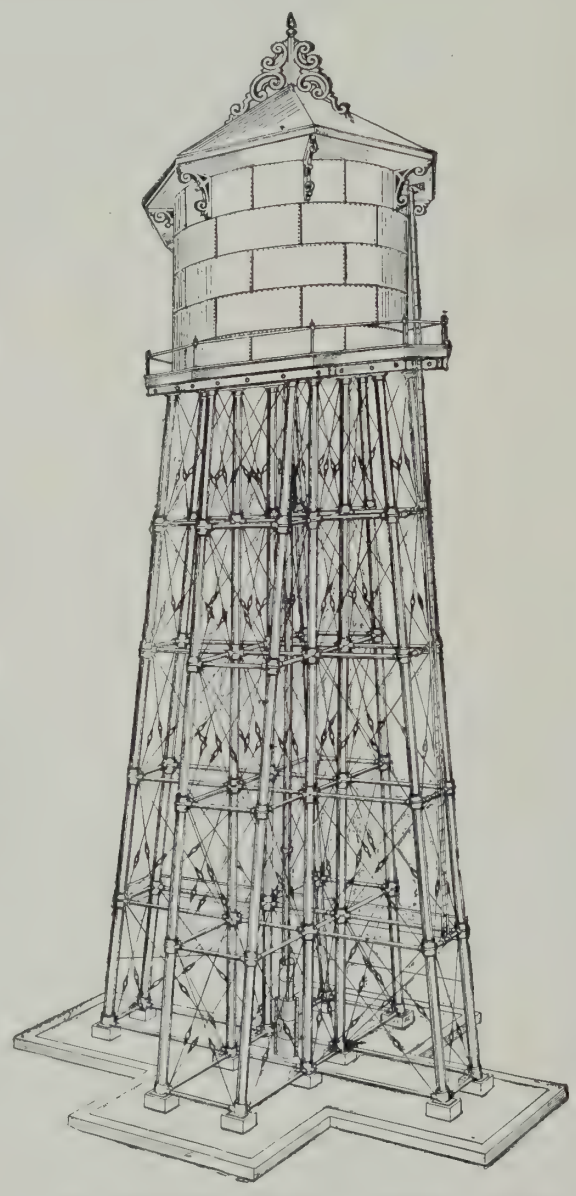
The American Boiler Company.

This company, whose main offices are at Chicago, has manufacturing plants at Brooklyn and Syracuse, N. Y., and at Detroit, Mich., turning out an immense output in ten different constructions, including the American, Florida, Modern and Soleil, steam heaters; and the Advance, Bolton, Little Giant, Perfect, Spence and Tropic, hot water heaters.

The company is most thoroughly equipped for the production of the best goods, at the very best prevailing prices. The company also carries a full line of radiators, pipe, fittings, valves and steam fitters' supplies, etc.

THE CALDWELL TOWER.

This simply constructed, yet handsome and very strong tower, for the elevation of tanks and water reservoirs for fire protection and other purposes, illustrates recently patented improvements in this line, of the W. E. Caldwell Co., Louisville, Ky., who have been for many years large manufacturers in this specialty, and supply an extended demand therefor in the United States and foreign countries. It is designed to afford the greatest strength with the least weight of metal, the columns being hollow cylinders, is seventy-five feet high, and supports a 200,000 gallon steel reservoir. The bottom or base plates are castings containing large iron sockets, which admit the columns for the first section, these columns



A TWELVE-COLUMN SECTIONAL ALL-IRON TOWER.

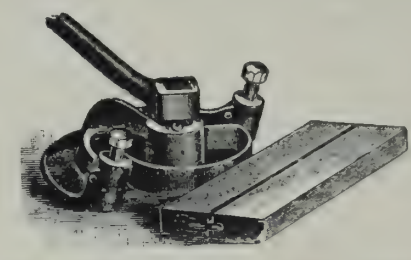
being tied together with a cylindrical pipe of smaller diameter than the main columns. Upon the top of each of the columns of the first section is a neatly-fitting coupling, having a socket in each end connecting the first and second sections, these couplings being cross-tied with smaller cylinders than the uprights, this arrangement being continued in sections of twelve feet each until the top is reached. There are steel brace rods connecting in truss form the couplings of one section with those of another, and thereby tying the whole structure firmly together. On the top is placed the heavy framework which receives the reservoir or tank. The centre pipe is for conducting the water from the pump into and from the tank, and on one side of the tower is a strong and neatly-constructed ladder for ascending to the top when necessary.

The company report a steady increase in the manufacture of their well-known Louisiana red and black cypress, cedar, and poplar wood tanks, as well as their iron and steel tanks, and are manufacturing daily into tanks about seven thousand feet of cypress lumber alone.

Mr. W. E. Caldwell is President of the company, and Mr. H. B. Wintersmith, who has been connected with the company since its organization, is Secretary.

THE "LITTLE GIANT" FLOOR CLAMP.

This implement is designed to be practically unbreakable, and has enormous power, being capable of exerting more than a ton pressure, while itself weighing only about six pounds. It can be quickly put in position or removed, and can be operated with but a small outlay of strength, not only as a floor clamp, but on the bench, and in almost any work where a beam clamp can be used.



THE "LITTLE GIANT" FLOOR CLAMP.

It measures 9 x 6 x 3 inches, and is put on the market at a low price by the Chandler & Farquhar Machine Tool Co., of No. 179 Washington Street, Boston.

The Akron Air Blast Furnace.

It is only about five years since this furnace was first placed on the market, but in that time it has made a remarkably successful record in the burning of any kind of soft or hard coal, natural gas or wood. It is now largely used in five different States, and its manufacturers, Messrs. May & Fiebeyer, of Akron, Ohio, have lately issued a catalogue containing many strong testimonials and long lists of those purchasing and using these furnaces. It is claimed that the "air blast" forms a retort, cokes the coal, consumes the gases while coking the coal, and then burns the coke, in such way as to insure perfect combustion without any escape of smoke and gases, while the fire is at all times absolutely under control. Intending purchasers should send for a catalogue.

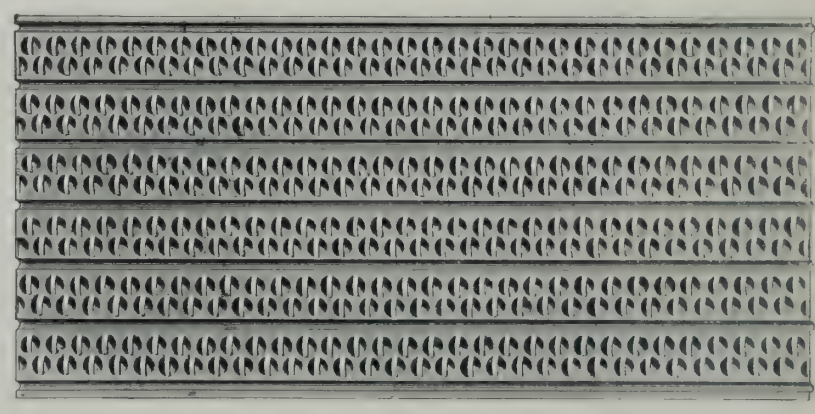
Laundry Glaze.

French Chalk	35	pounds.
Barilla Ash Soap	2	"
Borax	½	pound.
Resin	¼	"
Water	15	pounds.

This mixture is dried and powdered, or made into a paste, if desired.

THE "PIQUA" METALLIC LATH.

The Cincinnati Corrugating Co., with rolling mills, corrugating works, and offices at Piqua, Ohio, have recently perfected, and are now placing upon the market, a new and improved form of steel lath, shown in the accompanying engraving. It is made of the best grade of steel, in sheets 27¼ inches wide by 48 inches long, each sheet covering exactly one square yard of surface. These sheets are traversed lengthwise, at intervals of 3¼ inches, by ¾ inch corrugations, thus providing great rigidity and stiffness. Between these corrugations is formed a series of slots at right angles to the corrugations, the metal on either side of the slot being depressed into cuplike shape, into which the mortar or plaster easily slides, and, passing through, forms a "key" of great strength. This lath requires no stretching, stiffening pieces, nor staples for securing it to the framework, common nails only being used for attaching it in position. While this lath is used quite largely in buildings of wooden construction, it is principally used in strictly fireproof buildings in connection with iron beams and furring, and it is here that the rigidity and stiffness formed by the corrugations make it especially valuable, for the reason that the studding can be placed at least two feet apart, making thereby a great saving in the cost of the studding.

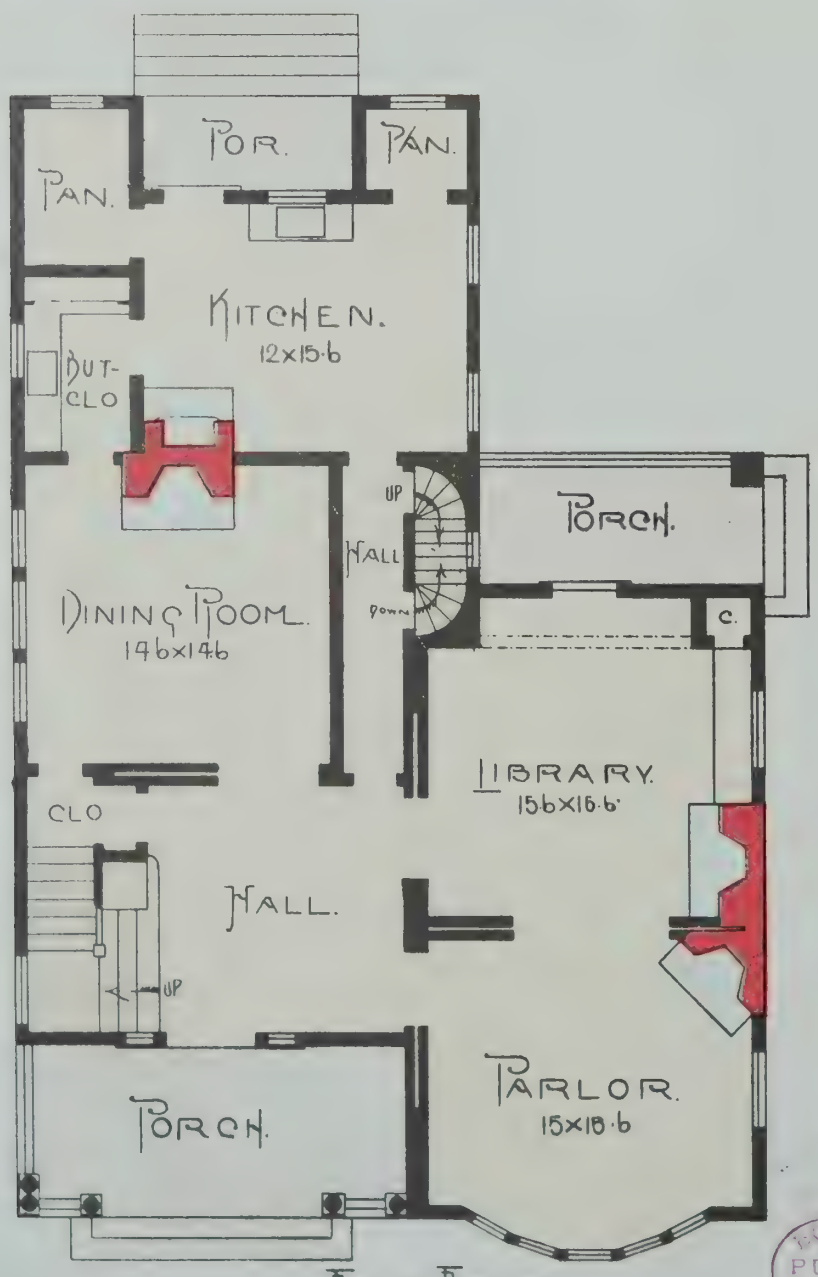


THE "PIQUA" METALLIC LATH.

Where this lath is used in connection with iron, the usual method is to wire it into place, the cost of which is little, if any, more than the cost of nailing it to wooden studs.

It is especially adapted for Adamant or Patent Plaster, and the rapidity and ease with which it may be applied to round, square, or angular surfaces, together with the fact that it affords a much firmer holding surface for the plaster, and its fireproof qualities, commend it to all architects, builders, and owners of buildings.

A RESIDENCE AT PLAINFIELD, N.J.



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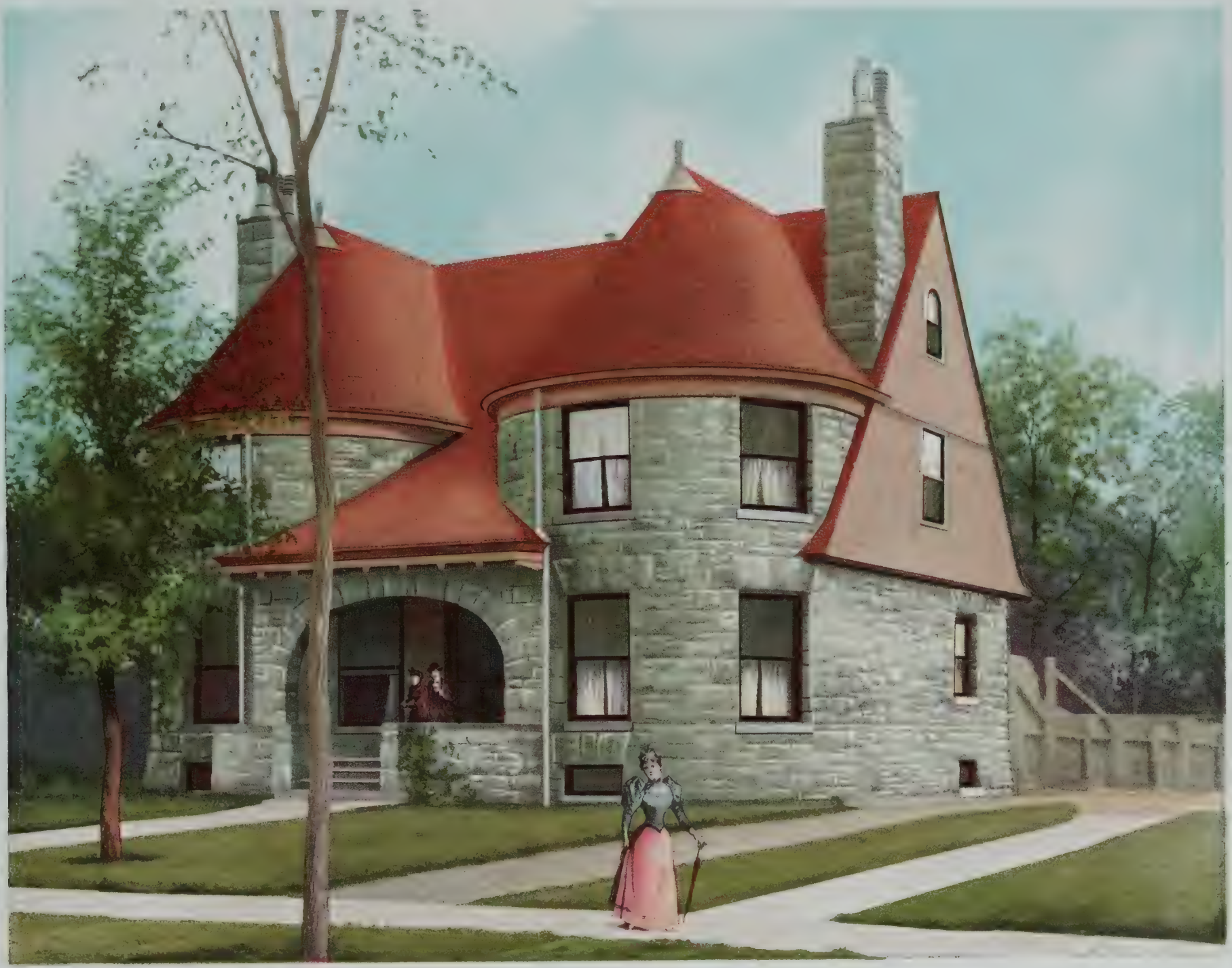
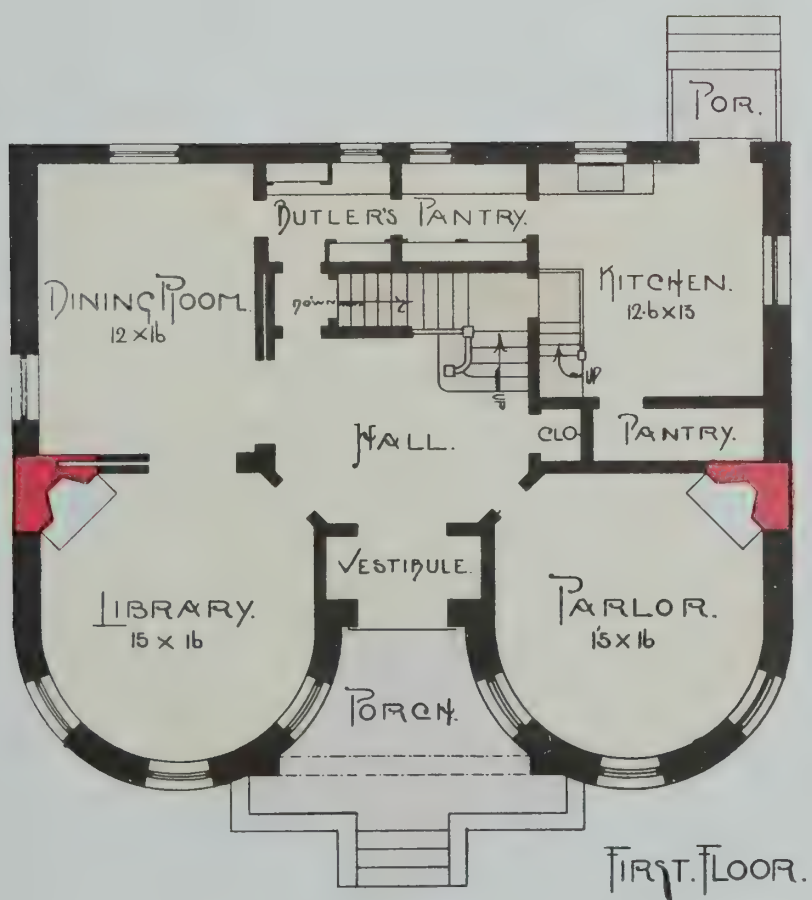
SECOND. FLOOR.



A DWELLING AT BUENA PARK, ILL.



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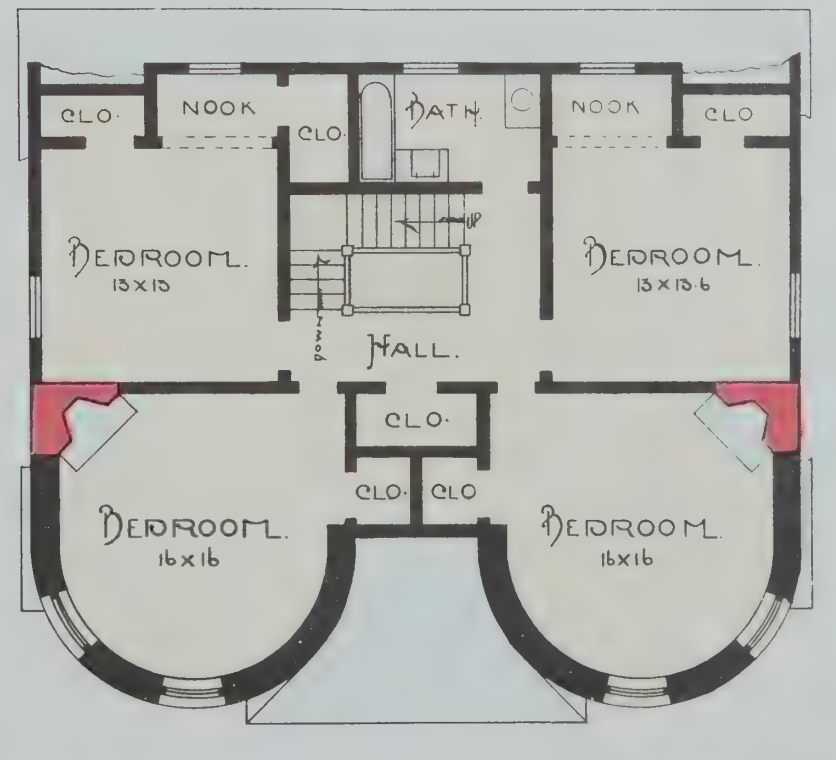

SECOND FLOOR.

SCHUMACHER & ETTLINGER, NEW YORK

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(Illustrated articles are marked with an asterisk.)

A RESIDENCE AT PLAINFIELD, N. J.

The subject of one of our plates in colors in this issue is a Colonial residence, recently erected for B. A. Hegeman, Jr., at Plainfield, N. J. An additional view is given on page 49, and an interior view on page 51. The design is appropriate to its surroundings, simple in its outlines, which are broken to give it a picturesque appearance, and is roomy and thoroughly comfortable. The foundations are built of brick. The first story is covered with beveled siding, and elsewhere shinglework. It is painted Colonial yellow, with ivory white trimmings. The roof is shingled and left to weather finish. Blinds painted bottle green. Dimensions: Front 36 ft.; side, 51 ft. 6 in., not including rear porch. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft., 6 in. The rooms on the first floor, consisting of a large hall, parlor, library, and dining-room, are thrown together, the vista from the several rooms being effective. The hall is a very unique apartment, and is trimmed with ash. It has a hardwood polished floor, a paneled wainscoting, and an ornamental staircase, with a low rise, broad landings, and newel post extending to ceiling. This hall is lighted effectively by several stained glass windows. The parlor and library are trimmed with whitewood, and treated in white enamel. The fireplaces in these apartments are furnished with tiles and Colonial mantels, with columns and mirrors. The library has a paneled divan, and a window opening out upon rear porch. Dining-room is trimmed with ash. It has a wainscot in panels, and a fireplace, trimmed with tiles and provided with a hardwood mantel. The floors are laid with North Carolina pine in narrow widths and polished. Kitchen and pantries are trimmed and wainscoted with yellow pine, and they are furnished with all the usual fixtures of the modern type in the best possible manner. The second floor contains a spacious hall, five large bedrooms, ten good sized closets and bath. These rooms are trimmed with whitewood, finished natural. Bathroom is wainscoted and paved with white enameled tiles, and is fitted up complete, with exposed plumbing. There are one bedroom and ample storage on third floor. Cemented cellar contains furnace, laundry and other apartments. This house has been duplicated at Jamaica, Long Island, for $6,000. Mr. Frank W. Beall, architect, 318 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT BUENA PARK, ILL.

One of our plates in colors this month represents a very attractive stone dwelling recently erected for H. J. Peet, Esq., at Buena Park, Ill. An additional view is given on page 60. The design is pleasing, and the plans present a unique arrangement. The various apartments are finished in a very handsome manner. The underpinning, first and second stories are built of rock-faced stone of a reddish brown color. The gable ends are sheathed, covered with shingles, and stained mahogany color. Roof is shingled and painted red. Dimensions: Front, 43 ft.; side, 35 ft. 6 in, not including front porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. Vestibule is trimmed with oak. It has a tiled floor and paneled wainscoting. The main hall is trimmed with oak. It has a paneled wainscoting, hardwood floor, and an ornamental staircase, with newel post, rail and balusters turned out of similar wood. The parlor is isolated from the remainder of the living rooms, and is trimmed with white pine and treated with ivory white and gold in a delicate manner. It contains an open fireplace, with tiled trimmings, and a dainty mantel with columns and mirror. Library and dining-room are trimmed with oak. The former is provided with an open fireplace, and the latter with a paneled wainscoting. Kitchen and pantries are trimmed and wainscoted with white pine and finished natural. The pantries are fitted up with drawers, shelves and cupboards, and the kitchen is provided with the usual fixtures. Second and third stories are trimmed with similar wood and finished natural. The second floor contains four bedrooms, large closet and bathroom, and the third floor contains two bedrooms and ample storage. Bathroom is wainscoted and furnished with the usual fixtures. Cemented cellar contains laundry, furnace and other necessary apartments. Mr. J. L. Silsbee, architect, Lakeside Building, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT BRIDGEPORT, CONN.

We publish on page 52 a dwelling recently erected for Frank Fowler, Esq, at Bridgeport, Conn. The building combines good elevations and excellent plans. The materials are of the best quality, and the workmanship unsurpassed. It is constructed in a thoroughly substantial manner. The underpinning is built of local bluestone, with faces left rough as they come from the quarry. The framework above is covered with sheathing and paper. The first story is clapboarded, and the second story shingled. It is painted pearl-gray, with darker trimmings. Roof is slated. Dimensions: Front, 35 ft.; side, 54 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with whitewood, finished natural. Reception hall contains an ornamental staircase, turned out of ash. A bay window is thrown out at first landing, and the windows are provided with stained glass transoms. Parlor is provided with an open fireplace, furnished with tiled trimmings and a hardwood mantel. Library is spacious, and dining-room is well lighted and ventilated, the latter having a hardwood floor. Kitchen and pantries are wainscoted with narrow beaded stuff, and each is furnished with the usual fixtures. The second floor contains four bedrooms, large closets, and bath. The third floor contains two bedrooms and ample storage. Bathroom is wainscoted and fitted up replete. Cemented cellar contains furnace, laundry, and other apartments. Cost, $5,600, complete. Mr. A. H. Beers, architect, Post Building, Bridgeport, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT STRATFORD, CONN.

We present on page 53 a cottage recently completed for Mr. Robert Wheeler, at Stratford, Conn. The design is unique, and it presents both pleasing elevations and a well arranged plan. The underpinning is built of brick. The exterior walls above, of wood, are covered with shingles, and stained sienna, with trimmings painted bottle-green. The first floor is trimmed with white pine and finished natural. Hall, spacious, contains an ornamental staircase of yellow pine. Parlor has an open fireplace, built of buff brick, and furnished with a slate hearth and mantel of ash. The dining-room has a small bay window, built in for a small conservatory. Kitchen is wainscoted with narrow beaded stuff, and is furnished complete. There are four bedrooms and closets on second floor, and one bedroom on third floor, besides ample storage. These apartments are treated in colors. Cemented cellar contains furnace and other apartments. Dimensions: Front, 26 ft. 6 in.; side, 34 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 8 ft. 6 in.; second, 8 ft.; third, 8 ft. The cost was $2,600, complete. Mr. Edgar Osborne, builder, Stratford, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A BELLE HAVEN RESIDENCE.

We publish on page 56 a residence recently completed for J. E. Kent, Esq., at Belle Haven, Conn. The design is treated in the modern Colonial style. The underpinning is built of rock-faced bluestone. The exterior framework above is covered with sheathing paper and cypress shingles, left to weather finish. The trimmings are painted white, and the blinds are painted bottle-green. The roof is also shingled. Dimensions: Front, 36 ft. 6 in.; side, 40 ft., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in; first story, 9 ft.; second, 8 ft 6 in.; third, 7 ft. 6 in. The interior throughout is trimmed with whitewood, finished natural. The hall is treated in the Colonial style, and is provided with a staircase turned out in a similar manner with carved newels. The floors on first and second stories are laid double. Hall, parlor, library and dining-room are separated by archways provided with spindle transoms, and each has open fireplace, built of Philadelphia pressed brick, and furnished with tiled trimmings and Colonial mantel of oak. The butler's pantry is fitted up with bowl, drawers, dressers and dumbwaiter to basement. Second floor contains four bedrooms, large closets and bathroom, the latter wainscoted and furnished in the usual manner. Third floor contains four bedrooms. The tower room is particularly adapted for a study or den. The cellar, or basement, is provided with kitchen, laundry, store pantries, furnace and other apartments. Cost, $6,850, complete. Messrs. Rossiter & Wright, architects, New York, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COLONIAL DOUBLE HOUSE.

The subject of illustration on page 57 is a Colonial double house, recently completed at Nos. 18 and 20 West 30th Street, Bayonne City, N. J. Dimensions: Front, 40 ft.; side, 40 ft. 6 in., inclusive of bay, but not of piazza. Heights: Cellar, 7 ft. 4 in.; first story, 9 ft. 4 in.; second, 9 ft.; attic, 8 ft. 6 in. The design, while quite inexpensive, is well balanced and pleasing in appearance. Tuscan columns supporting roof of piazza, forming a balcony above, as well as the balustrade around the roof of bays, and the band of wavy shingles, relieve it considerably. Foundation is of red, well burnt brick, with bluestone sills to windows. Exterior framework is covered with sheathing, felt paper and clapboards, painted light yellow on first story; above, including roof, being shingled and left to weather. Columns, as well as all trimmings, painted cream-white. Blinds, dark green. The interior arrangement shows entrance hall with an arch to parlor, which has fireplace and mantel, and connects with dining-room through 8-foot arched opening. Kitchen has all necessary fixtures, and back staircase leading to floor above, where plans show three chambers and bath-framework above is sheathed, shingled and painted drab, with ivory-white trimmings. Roof shingled and painted red. Dimensions: Front, 34 ft.; side, 44 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with whitewood, finished natural. Doors and windows have heavy moulded casings. Hall has a paneled wainscoting. It is separated from staircase hall by columns extending to ceiling and supporting a spindle transom. The staircase is an ornamental one with spindle rail, balusters and newel posts. Parlor and library are separated by double sliding doors, and the former is spacious and well lighted, and the latter is provided with an open fireplace, furnished with tiled hearth and facings and a hardwood mantel. Dining-room is provided with a similar fireplace and a china closet, fitted up with bowl and dresser. Kitchen is wainscoted with narrow beaded stuff, and is provided with large pantries, sink and dresser. The floors on first story are laid with hardwood. There are four bedrooms, large closets and bathroom on second floor. The front bedroom has a large alcove, and a window running down to floor and 44 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. The entrance hall is trimmed with ash. It contains an ornamental staircase, with carved newels, spindle balusters and rail. It has also a paneled seat, and stained-glass windows, shedding a soft and pleasant light over upper and lower hall. The parlor is trimmed with cherry, and the dining-room with whitewood, finished natural. These apartments have open fireplaces, furnished with tiled hearths and facings, and provided with hardwood mantels, with columns and mirrors. The butler's pantry, of unusual large dimensions, is fitted up with drawers, shelves, and dressers complete. Kitchen and other pantries are trimmed and wainscoted with yellow pine, and are finished natural. The former is provided with the usual fixtures. The second floor is trimmed with whitewood, and finished natural, with the exception of the bedrooms over dining-room, which is stained and finished in cherry. This floor contains five bedrooms and bathroom, the latter wainscoted and provided with the usual fixtures. The third floor contains two bedrooms and ample storage. Cemented cellar contains furnace

A RESIDENCE AT PLAINFIELD, N. J.—See page 50.

room, with plumbing exposed and of the best. There are three rooms finished off in the attic. Finish throughout, white pine, hard oiled in principal rooms. Hardwood mantels of pleasing design in parlor and dining-room. Cellar is cemented, and contains laundry, hot-water heater and fuel storage. Party wall is pugged with brick. House is lighted by gas, and cost complete, with exception of heating apparatus, $4,800. Arthur Curtis Longyear, Esq., 126 Liberty Street, New York, was the architect.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT BENSONHURST, LONG ISLAND.

We publish on page 54 photographs of a dwelling recently erected for John P. Jepson, Esq., at Bensonhurst, Long Island. The design presents an excellent example for a suburban home, and combines both pleasing elevations and floor plans that show a compact and convenient interior arrangement. The underpinning is built of brick, laid up in red mortar. The exterior opening out upon balcony. The bathroom is well fitted up and furnished with the usual fixtures complete. There are two bedrooms and ample storage on third floor. The cemented cellar contains furnace, laundry and other necessary apartments. Cost, $5,620, including everything complete, ready for occupancy. Mr. William H. Mersereau, architect, 39 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

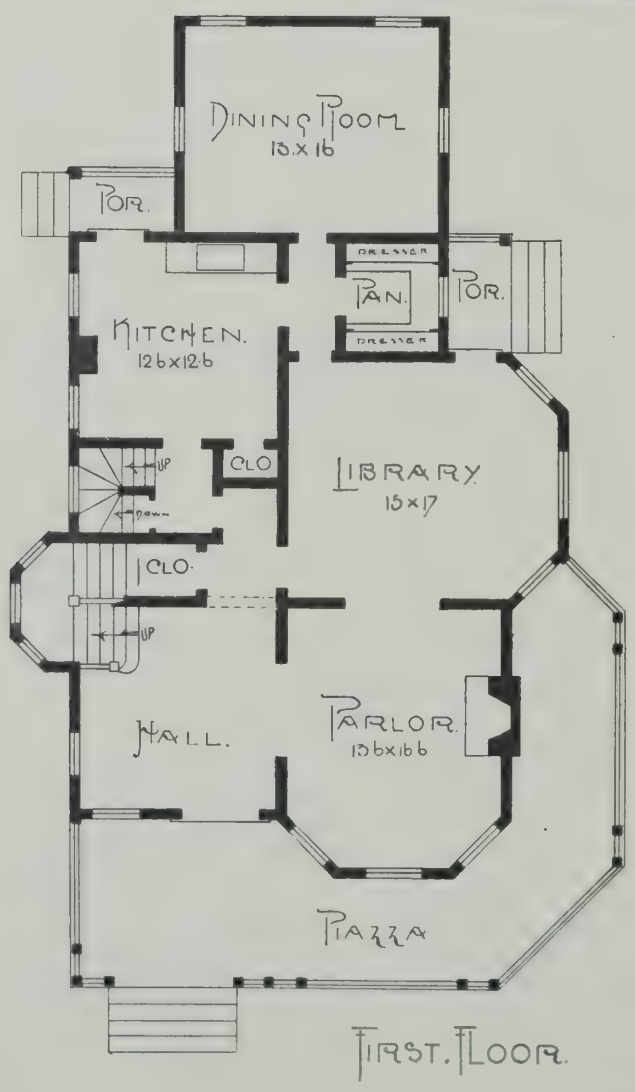
A DWELLING AT FLATBUSH, LONG ISLAND.

We present on page 58 a dwelling recently completed for Richard Ficken, Esq., at Flatbush, Long Island. The engravings show a design treated in the Colonial style, and it has a spacious piazza, and floor plans conveniently arranged. The underpinning is built of local brick, laid up in red mortar. The exterior walls are sheathed and papered. The first story is clapboarded, and the second story is shingled. It is painted Colonial yellow, with ivory-white trimmings. The roof is shingled also and left to finish natural. Dimensions: Front, 32 ft.; side, and other necessary apartments. Messrs. J. C. Cady & Co., architects, New York, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A Mahogany Pavement.

The dealer in hardwood who tenderly handles his stock of mahogany with kid gloves for fear of losing a splinter now and then will undoubtedly be shocked, says the *Mississippi Valley Lumberman*, to hear that mahogany is being used by the Paris Municipal Council for roadways. This sounds almost like a dream of oriental magnificence, yet it is true. A portion of the Rue Lafayette has been pulled up, and workmen are laying down blocks of real Brazilian mahogany, of a fine texture and color. It is, however, an experiment, as mahogany is dearer than other woods usually used for this purpose, but it is expected that the extra outlay will be more than compensated for by the greater durability of the mahogany.



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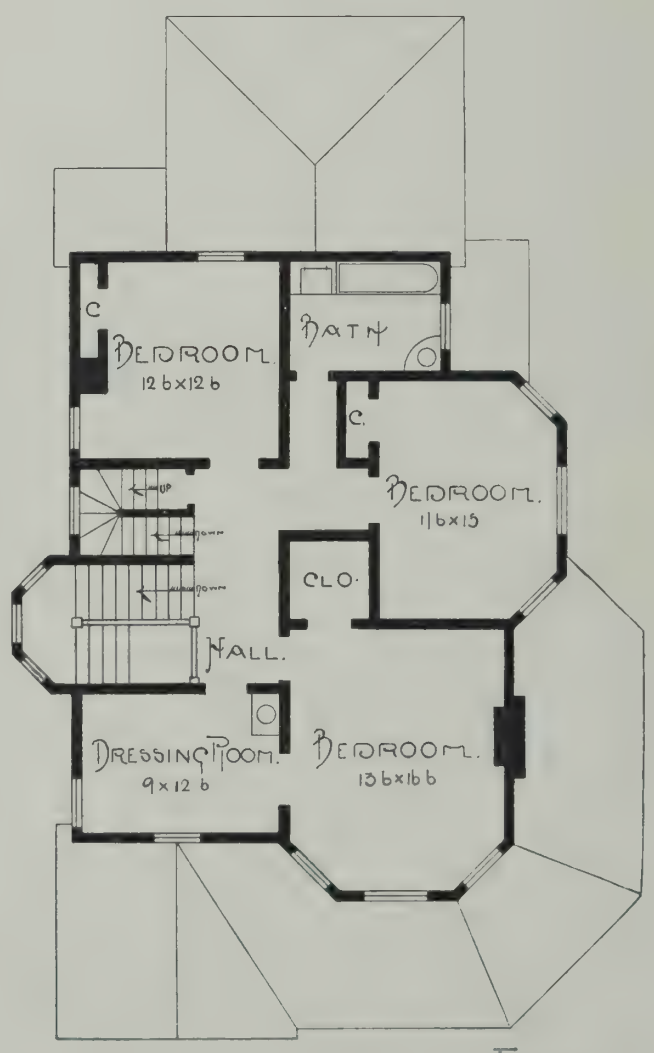
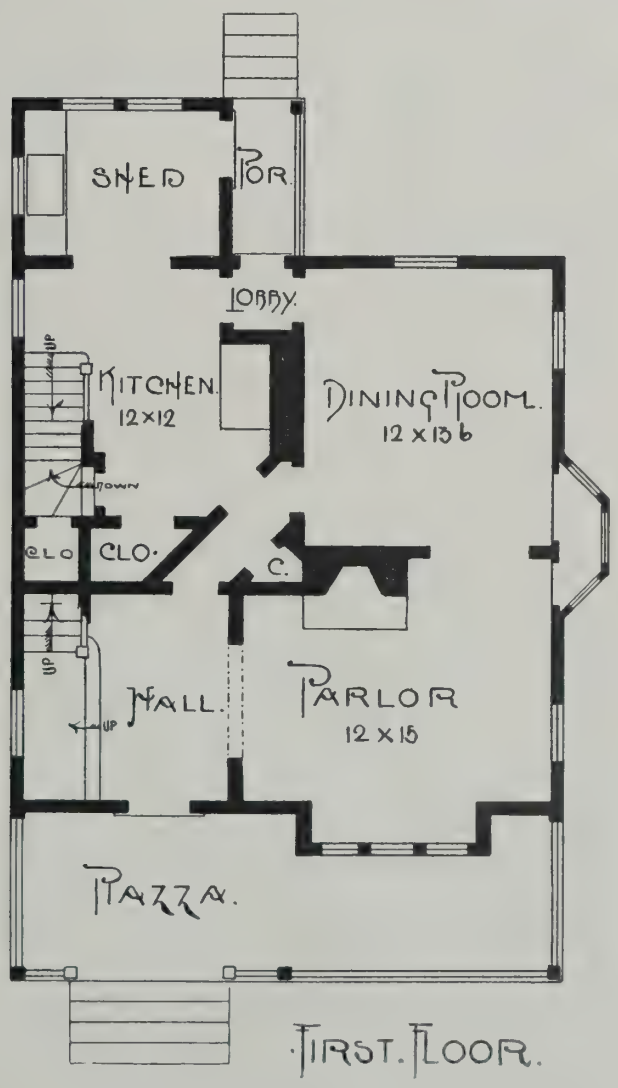


SECOND FLOOR

A DWELLING AT BRIDGEPORT, CONN.—See page 50.



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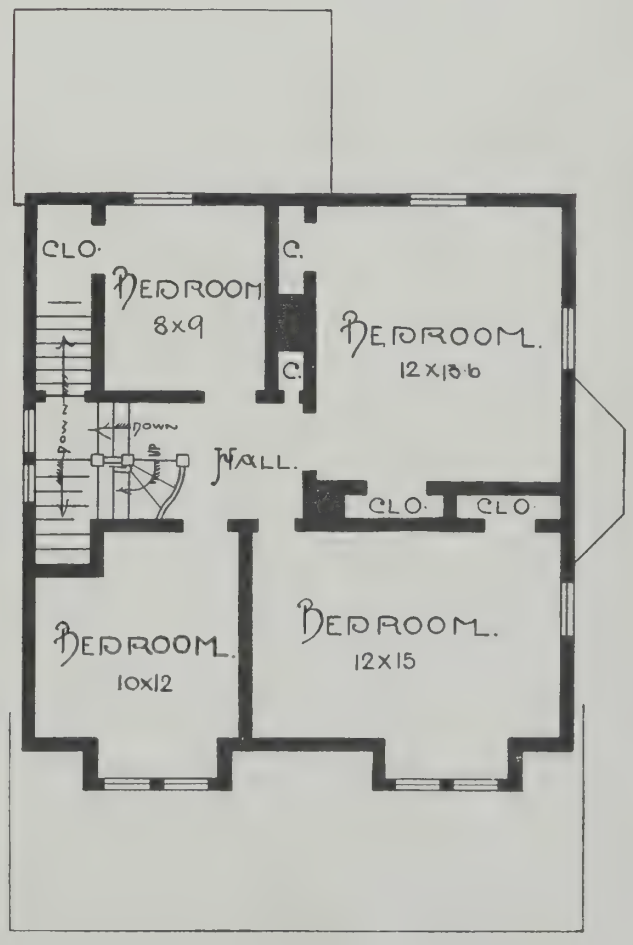

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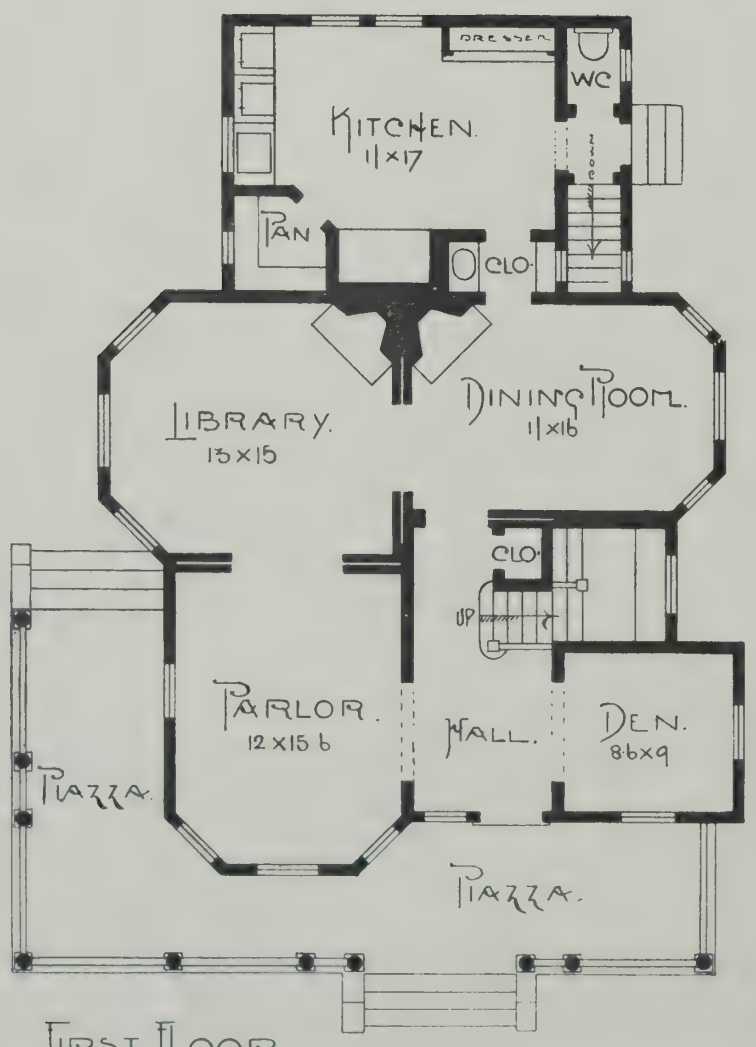
A COTTAGE AT STRATFORD, CONN.—See page 50.



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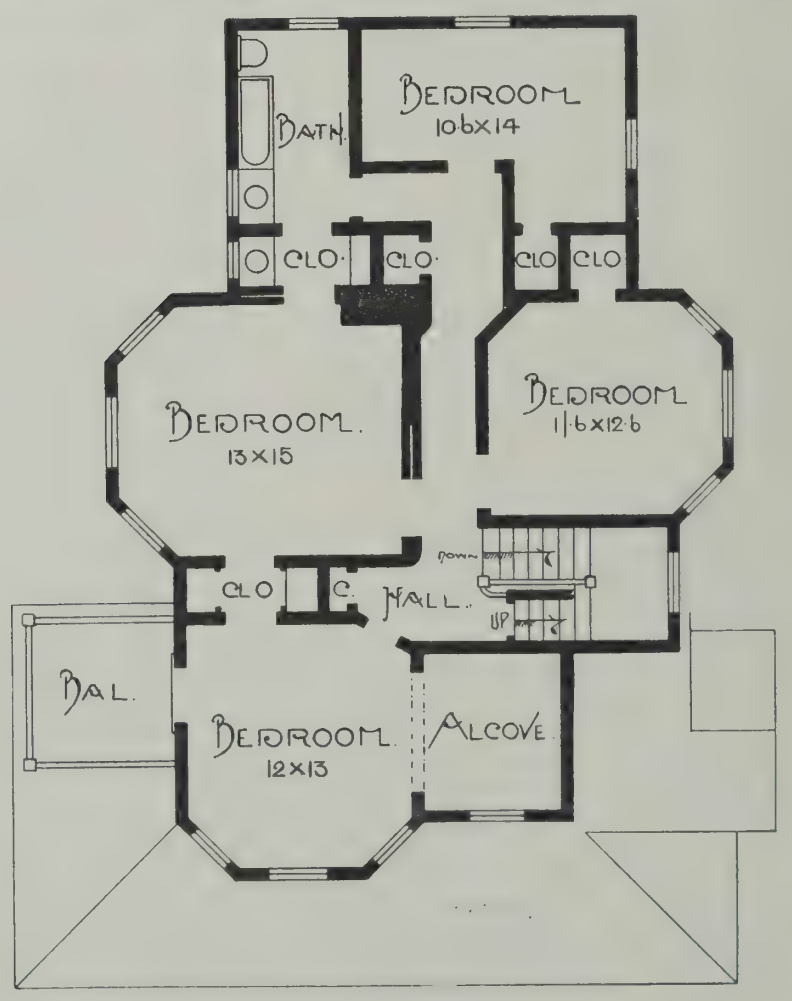
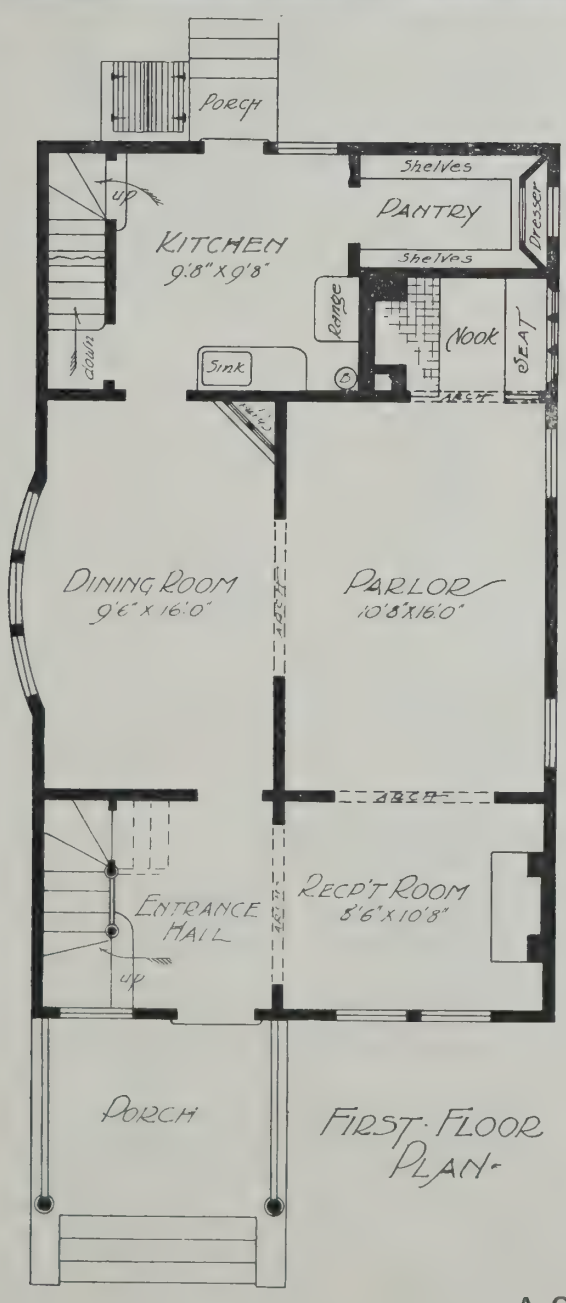
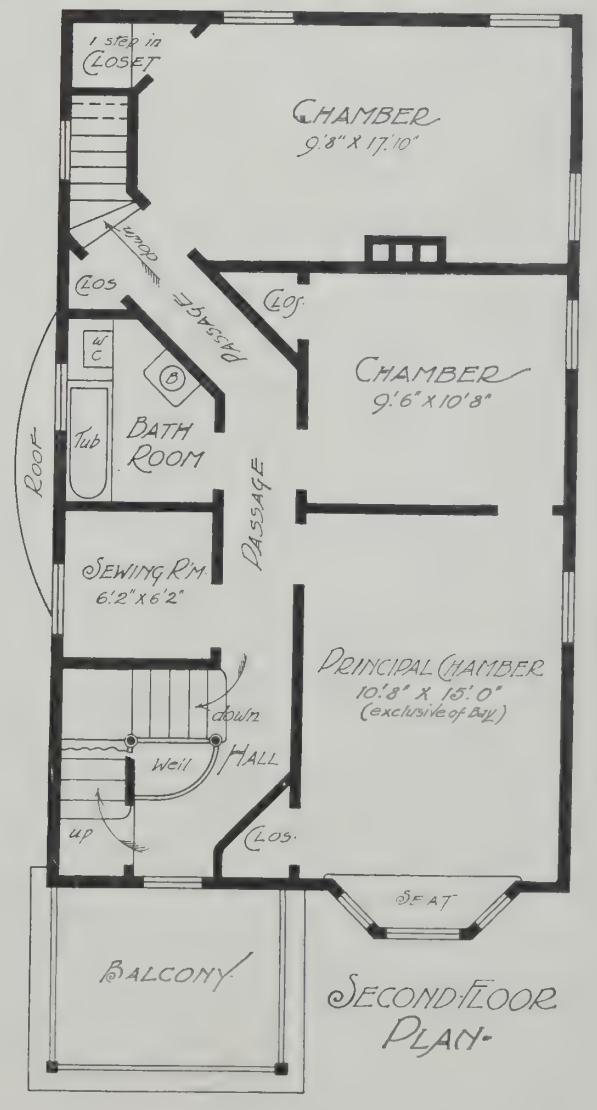


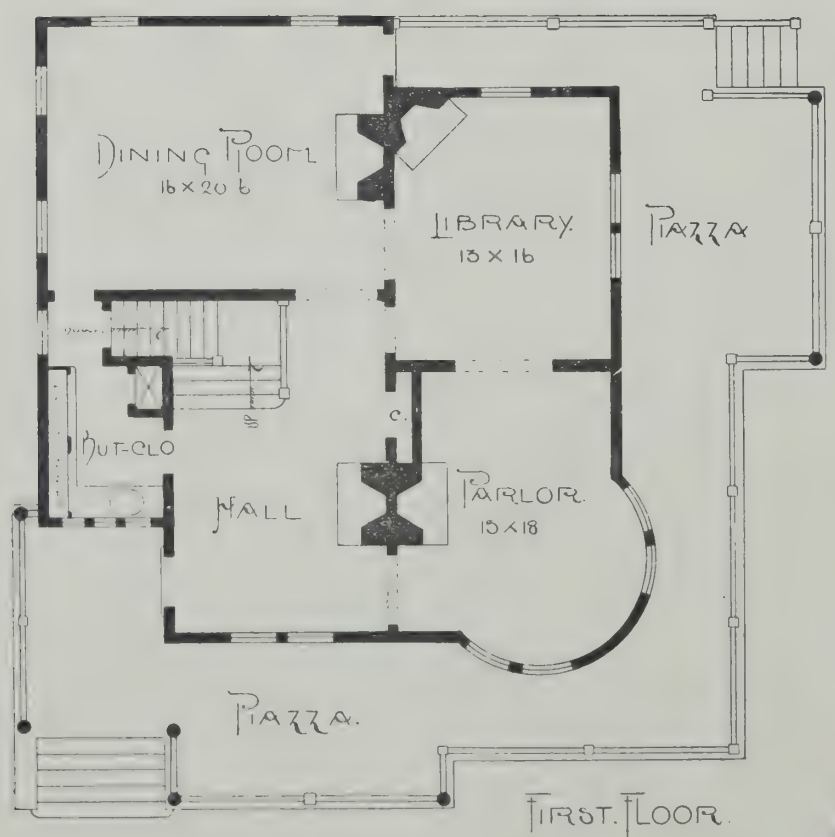
SECOND FLOOR.

A DWELLING AT BENSONHURST, LONG ISLAND.—See page 51.

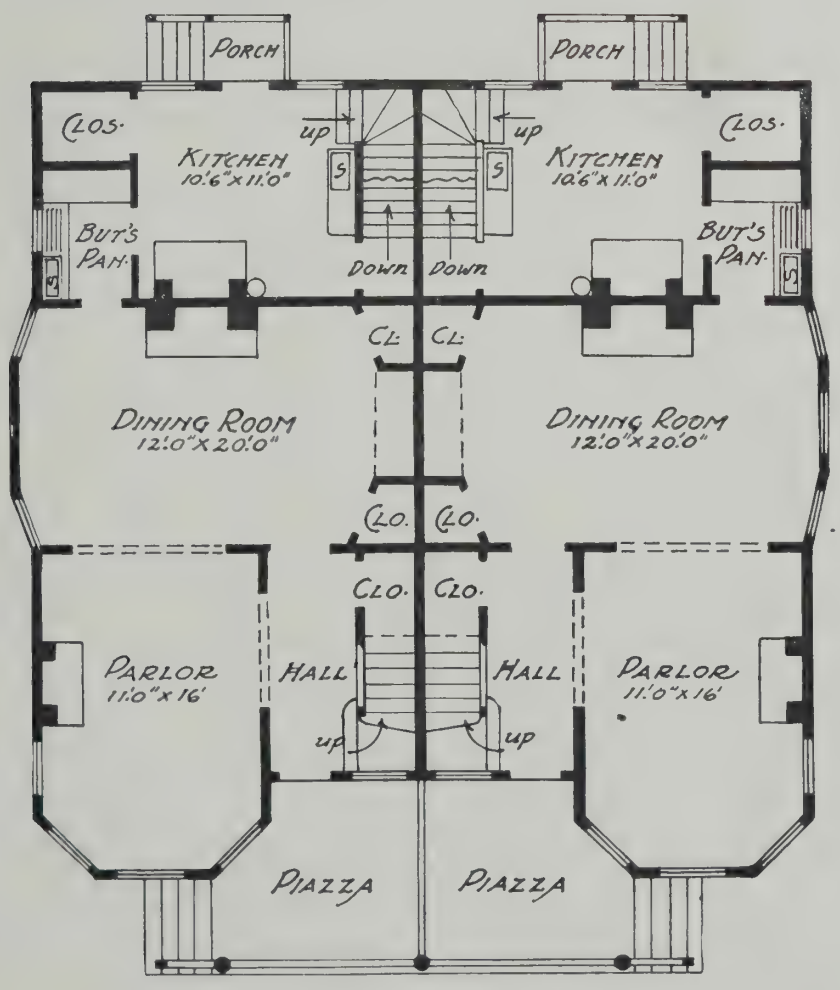




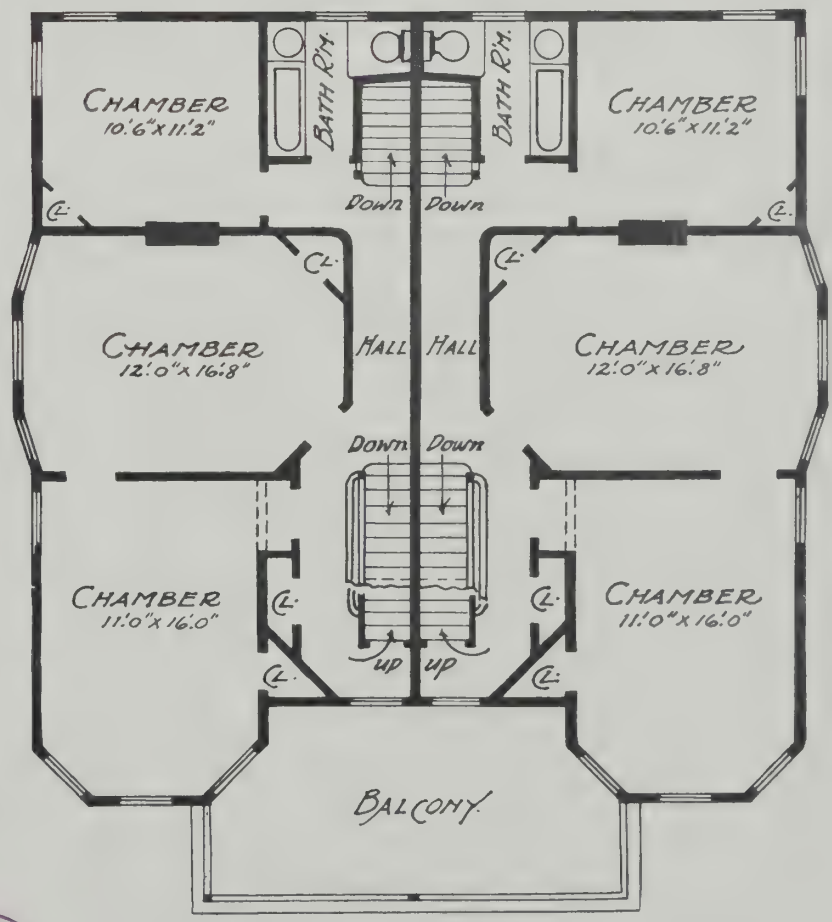
A COTTAGE AT BAYONNE CITY, N. J.—See page 60.



A BELLE HAVEN RESIDENCE.—See page 50.

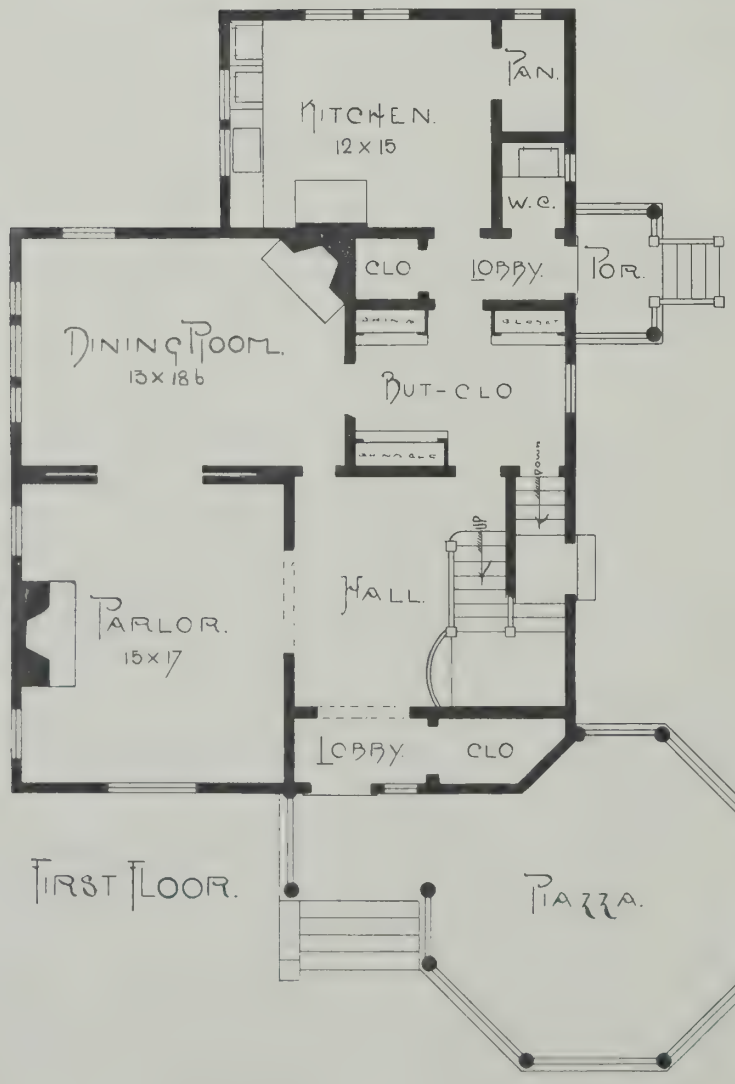


FIRST FLOOR PLAN.

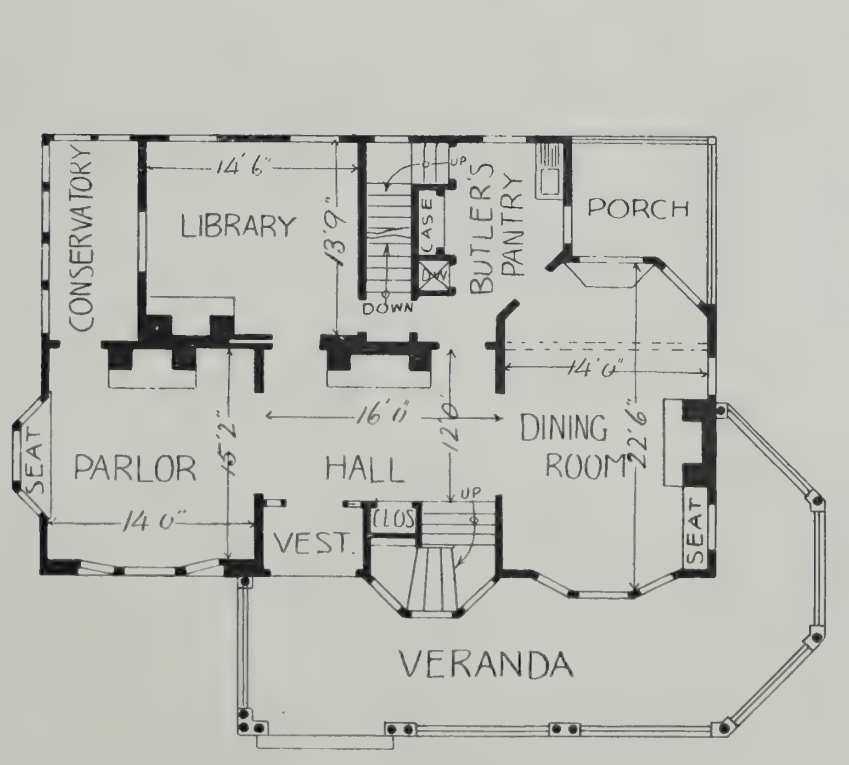


SECOND FLOOR PLAN.

A COLONIAL DOUBLE HOUSE.—See page 51.



A DWELLING AT FLATBUSH, LONG ISLAND.—See page 51.



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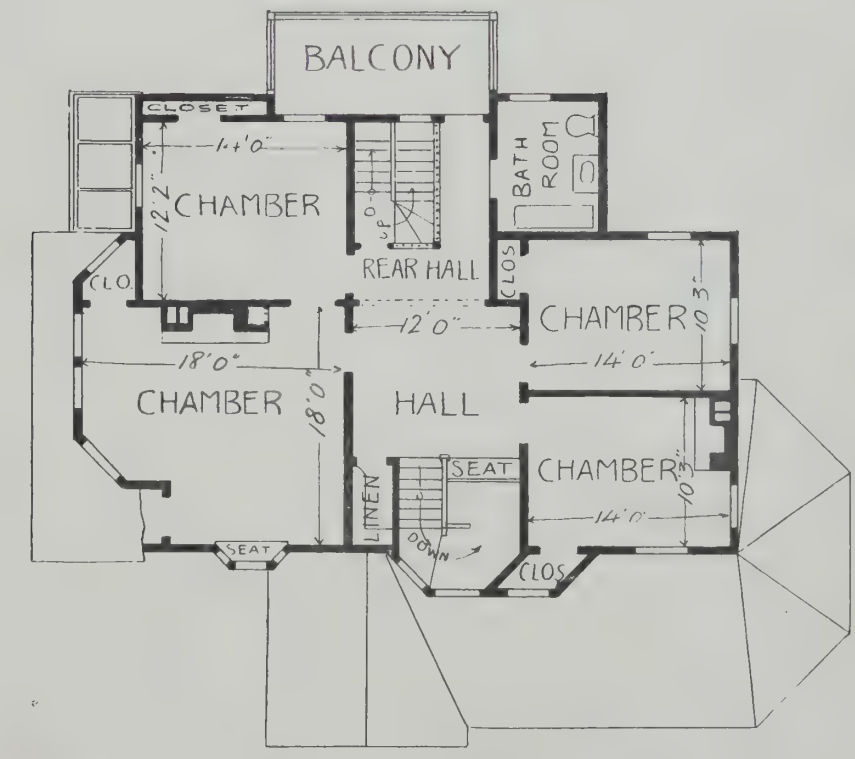


SECOND FLOOR PLAN

A RESIDENCE AT POMPTON, N. J.—See page 60.

A COTTAGE AT BAYONNE CITY, N. J.

On page 55 we illustrate a small Colonial cottage, situated at No. 678 Avenue C, Bayonne City, N. J., residence of A. D. Woodruff, Esq. The design has a simple, yet pleasing exterior. The entrance porch extends 8 feet beyond face of building, with two Tuscan columns supporting roof, forming balcony above, circular bay at side, and also the one in front, making effective features. Dimensions: Front, 21 ft. 6 in; side, 36 ft. Heights: Cellar, 7 ft. 2 in.; first story, 9 ft. 2 in.; second, 9 ft.; attic, 8 ft. 6 in. Foundation of brick, stone window sills, framework above, sheathed, papered, clapboarded, and painted Colonial yellow in first story; all above, including roof, shingled and left to weather. Trimming color, cream-white; sash and latticework painted deep green. Front door of oak, glazed with heavy beveled glass. Entrance hall is sand-float finish, with staircase in ash; ornamental newel, with candelabrum. Broad arch connects hall with reception-room, which has open fireplace, tiled with light yellow tiles, Colonial mantel, with long columns and plate mirror. This room connects with parlor by wide arched opening. Nook has fireplace, and seat at mullioned window. Dining-room opens into parlor, and has circular bay, and china closet in corner. Kitchen complete with usual fixtures, large pantry with dresser, etc., and back stairs. Second floor is divided into three chambers of fair size, with closets nicely worked in, sewing and bath room; plumbing exposed. Attic has one room finished off. Cellar, cemented, contains laundry, heating apparatus, and fuel storage. Finish: Hall and bathroom, ash; rest white pine, hard oiled on first floor; painted above. Cost, complete, $2,800. Arthur Curtis Longyear, Esq., architect, 126 Liberty St., New York.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

RESIDENCE AT POMPTON, N. J.

This design, shown on page 59, of a house built for Mr. Wm. F. Hall, is especially advantageous for an all-the-year round residence. It is easily heated in winter, and can be readily thrown open in summer, so that all the air stirring is circulated throughout the house. There is a basement, where a billiard room, laundry and kitchen are finished. This portion of house has the outside walls built of fieldstone. The first floor is arranged for comfort and ready communication with the rest of the house. All rooms on first floor have open fireplaces. Hall is picturesque, and has broad staircase. There is a conservatory opening off of the parlor. Rear stairs run up to third story. Four large bedrooms, bathroom and linen closet on second floor. Three rooms in attic. The cost is about $7,500.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

Proportion in Architecture.

If we ask what are beautiful proportions, we shall be told "just" ones; when, if not satisfied with such elucidation, we return to the charge and inquire what are just proportions, we shall, perhaps, be further enlightened by being assured that they are those which are harmonious and conduce to beauty. For the human figure and other animal forms there are standards of normal proportions, fixed by nature herself. But in architecture there is no immutable standard of proportion for any one style, much less one applicable to all styles alike. In the Greek orders we find the very extremes of proportion—such as could not be exceeded either way without falling into deformity and disproportion—in the Paestum Doric, and the slender, comparatively too slender, Corinthian. Yet, utterly dissimilar as they are, all the orders may be said to be admirably proportioned in themselves, which, however, instead of at all simplifying the matter, only renders the subject of proportion the more abstruse and perplexing. The very best proportions are only relatively good, for, differently applied, they might be far from pleasing, or even be absurd—at the utmost, only average proportions, suitable for general guidance and for ordinary cases; and so far from being abided by, such average may frequently be greatly exceeded with the happiest effect. What, for instance, is loftiness but an unusual degree of height in comparison with breadth, or height exceeding the usual relative proportion which it bears to width? To attempt to fix invariable proportions by rule is worse than nugatory, since it is positively mischievous, and detracts from the privileges of art, rendering that a mere mechanical process which ought to be determined very differently. After all, it is the eye which judges of proportions; therefore, surely the eye of the architect—supposing him to be at all worthy of such name—ought to be able to decide what are pleasing proportions quite as well as that of other people. And so that they be pleasing, it matters not at all how much they deviate from ordinary routine and its rules. Undue stress is laid upon proportion because it is generally spoken of as if it were all-sufficient in itself alone, and capable of insuring excellence, whereas it is only one element of beauty in design. Besides which the term itself is usually understood in only a very limited meaning, namely, with reference to that mechanical species of it which concerns itself with merely parts and individual members or features, without that higher artistic one being included in the idea of it which, being assured that they are those which are harmonious and conduce to beauty. For the human figure and other animal forms there are standards of normal proportions, fixed by nature herself. But in architecture there is no immutable standard of proportion for any one style, much less one applicable to all styles alike. In the Greek orders we find the very extremes of proportion—such as could not be exceeded either way without falling into deformity and disproportion—in the Paestum Doric, and the slender, comparatively too slender, Corinthian. Yet, utterly dissimilar as they are, all the orders may be said to be admirably proportioned in themselves, which, however, instead of at all simplifying the matter, only renders the subject of proportion the more abstruse and perplexing. The very best proportions are only relatively good, for, differently applied, they might be far from pleasing, or even be absurd—at the utmost, only average proportions, suitable for general guidance and for ordinary cases; and so far from being abided by, such average may frequently be greatly exceeded with the happiest effect. What, for instance, is loftiness but an unusual degree of height in comparison with breadth, or height exceeding the usual regulating the whole of a composition, stamps it to the eye at once as a captivating *ensemble*, all whose parts are in perfect keeping. That kind of proportion is quite beyond the reach of rules. Those who cannot find out for themselves how to produce it must dispense with it, trusting that it will never be missed by those who are content with proportion in pieces and bits—by hairbreadth measurers of columns and mouldings.—*The Architect.*

A DWELLING AT BUENA PARK, ILL.—See page 50.

An Architect Who Never Exceeded Estimates.

Archbishop Bernardo built a hermitage on the hill of *La Vera Cruz*, "the true cross," to which a retable was given in 1492, by Pedro Gumiel, an architect of Alcala, who is generally called *Elhonrado*, because his works never exceeded his estimates; and all who to their cost have dabbled in bricks and mortar, raw materials of ruination, will visit this good man's memorial, since, take him for all in all, they ne'er will see his like again in Spain, or out of it. Even Solomon, the wisest of men and greatest of builders, was out in his reckoning to the tune of $3,610,000, which he borrowed of a friend (I. Kings ix. 11).

Some Differences between the English and American Plumbers.

According to an article in the *Sanitary Plumber*, there are a great many radical differences between the work of the American plumbers and the English workmen in the same line; in fact, the plumbing business in Great Britain and America is carried on upon entirely different lines. On the other side of the water the plumber habitually does roofing, makes pipes and flashings, uses lead wastes, makes lead fixtures, is usually a gasfitter, and very generally does decorating work. To a builder he is very frequently a general utility man.

It is very rare to find an American plumber in the roofing business. In fact, the two lines are usually as separate and distinct, in all except the smaller shops and those with questionable characters, as the drygoods trade and the grocery trade would be. On the other side the union of the two trades was a very natural one, because in the early days the lead roof was one of the most common coverings for buildings, and the plumber, being a lead worker, found quite as much to do on the roofs as with other parts of the drainage of a house. In fact, it seems that the plumber's original business was that of the sheet lead worker, and consequently he was really more of a roofer than anything else, and, being a roofer, flashings were a part of his work.

The use of the outside waste and vent pipes is something that is very difficult for the American plumber to understand. In such work open joints or their equivalents are necessary for taking up expansion and contraction. The fact that the winters are comparatively mild prevents the wholesale destruction of the plumbing which would take place in this country with a similar construction. The outside position of the pipes renders them less liable to destruction by vermin than if they were placed within the building. The fact, however, remains that the winters are frequently severe enough to produce frost, and at such times it is difficult to see how a lead system on the exterior wall of a house could be operated without instant destruction, or, at least, stoppage. All the English authorities on plumbing, while speaking of the inside work and recommending it, fall back on the outside work as the style which, after all, seems best suited to the demands of the people. The English plumber still does a great deal of lead work which in this country has been superseded by materials obtained from the manufacturers ready for use.

Lead trap making is, in this country, a thing of the past. Even the bottle trap is now a commercial article, and there is nothing remaining that needs to be made in the shop. Service boxes and drip trays are no longer made of lead, so that the modern American plumber has little to do in general plumbing work beyond bending and fitting pipe and making safes. In the better class of work even safe-making is disappearing and water-tight floors are taking its place. It is not an unheard-of thing to find first-class jobs in this country where not five pounds of lead have been employed on the whole of the plumbing work.

Here, as in England, gasfitting is recognized, and has been for many years a legitimate part of a plumber's business. In England the union of gasfitting and plumbing seems to go back to the very beginning of the art of conducting gas in pipes, and the continued use of the so-called "composition" pipe, which is a bendable pipe like lead, makes it there a very proper branch of the trade. Here, on the other hand, the plumber has taken to the use of iron, brass, and other hard metal pipes to such an extent that he has to have his shop fitted with most of the tools for handling wrought-iron pipe. Hence he naturally combines gasfitting with wrought-iron pipe work as a proper, legitimate branch of his business.

In this country there is a constant advance in the styles and manufacture of plumbing goods of all kinds. There is nothing used by the plumber, from a joint for lead pipe to a complete set of bathroom fixtures, that he cannot buy ready-made. The work is becoming more and more a trade in which science and the ability to set up ready-made fixtures and ready-jointed pipe are more essential than skill in working of lead. The schemes of plumbing and drainage, made necessary by our tremendous buildings, are of a character to call for scientific knowledge of the highest class, but the manual skill needed beyond that of making a perfect screw or calked joint does not seem to be called for. Job after job of fine plumbing work is turned out, and the master-plumber will tell you that he "did not use a pound of lead." It requires very little thought, therefore, to see that the tendency of plumbing work in the United States is diametrically opposite to that of Great Britain, and it remains to be seen whether, in the future, the lines of advancement are to be still further diverging or in common.

THE NEW PROTESTANT CATHEDRAL, BERLIN

From the Design of Prof. Julius Raschdorff.—Drawn by G. Theuerkauf.

THE NEW PROTESTANT CATHEDRAL, BERLIN.

We publish an engraving, for which we are indebted to the *Illustrirte Zeitung*, of the new cathedral at Berlin, as it will look when completed. The accepted design is the work of Prof. Julius Raschdorff. The Prussian Landtag appropriated $2,400,000 for the erection of the building.

The laying of the cornerstone by the Emperor was celebrated with great pomp on the 17th of June. The spirit of a great history gave the fête a special consecration, making it a day of honor in the church life of Germany. It was a fête of national significance, this laying of a cornerstone of a great cathedral, a worthy Protestant house of God that will stand for centuries as a token of the faith of the people and as a mother church for the nation. It is a realization of the wishes expressed years ago by the Queen of Prussia. Most of the buildings in the neighborhood of the cathedral square were decorated for the occasion, and the square itself looked like a pleasure garden, with its banners and flags and the shields bearing the initials of the Emperor and Empress, and the people who crowded the streets and the square were very enthusiastic, making it a most memorable occasion.

Decay of Stone.

Stones of uniform texture commonly decay by disintegration at the surface, losing grain by grain in proportion to time and exposure. But they sometimes suffer a singular change, as if baked at the surface. An external developing crust is thus formed, as at Stonehenge, where the interior is soft, but the exterior hard This process appears to render such a stone durable, but if carried further, so as to produce a new texture of the surface, the external shell separates from the interior mass, desquamates and falls off, leaving a rough, soft inner core. This happens even to moulded surfaces, like those of balusters. Stones composed of materials unequally mixed suffer unequal waste in different parts.

Shells, corals, concretions and crystallized masses thus appear prominent from earthy limestones, and indicate the general fact that in proportion to the force of molecular aggregation in the stone is the resistance which a stone, exposed in a building, will exhibit against wear. It is not the amount, but the kind, of exposure which governs the decay. The southern and western parts of our cathedrals yield, while the northern and eastern parts resist. Prominent cornices often are perfect, while below them the mouldings are reduced to shreds. The drip mouldings remain and are even hardened, while the parts which they were destined to protect have mouldered away.

EARTHENWARE houses are now in vogue. On a strong frame, large plates of terra cotta are nailed inside and out. The exterior plates are then plastered with cement. Floors and ceilings of same material.

ROMAN REMAINS AT BATH, ENGLAND.

According to the *London Daily Graphic*, the good intentions of the corporation of Bath in inclosing and erecting a roof over the ancient Roman bath, which is one of the principal glories of their interesting c ty, are likely to be received with but scant gratitude on account

THE ROMAN REMAINS AT BATH, ENGLAND.

of the apparent vandalism involved in the proceeding. The ancient outer wall of the building inclosed first a broad level platform, from which stone steps led down into the pool supplied by the warm springs, whose cures made Bath so famous a place of resort in the last century. Of course, the Roman building was covered with a roof—the English climate would not permit of a bath open to the sky; but this covering had gone many centuries ago. It is now proposed, as a measure of preservation, to erect piers on the platform on either side of the pool, the piers being connected by arches and supporting a new roof. Perhaps atmospheric conditions render some such precaution necessary—although the ruins have been exposed some time without any very noticeable effect having been produced upon them; but what is particularly objectionable in the scheme is that the new building will not correspond with the old one, the new inclosure being within and not upon the lines of the ancient wall, and so destroying the proportions of the building. The work will also ne(essitate very serious disturbance of portions of the ancient remains. These are proposals which antiquaries will hardly allow to pass unchallenged.

THE TEMPLE OF NEPTUNE AT PAESTUM.

Pesto is the modern Italian name of the station at which we stop. A warm, dusty walk of ten minutes took us through the low arched gateway of the more than half fallen walls of what was once an important Grecian city called Poseidonia. It was founded, according to Strabo, by the Dorians, in the sixth century B.C. Whatever traces of the subjugation of the town by the Romans during the Pyrrhic wars, of its prosperity under the republic, when it was called Paestum, and of its nearly complete destruction by the Saracens, may now exist, all the traces of these revolutions are buried beneath a scraggly growth of grass and low bushes.

The Grecian temples only remain to speak with majestic voice of the faith and architectural skill of their builders.

The Temple of Neptune is the central and best preserved of the three; the Basilica is near it on the south, so that, approaching as we did, our first impression of the grandeur and symmetry of the structures was received from these. All the temples are built of yellow travertine. Slight remaining traces of stucco show that the irregularities of the stone were once covered by it, and this, we may suppose, was adorned, according to the custom of the Greeks, with color and reliefs. The present rich golden brown of the travertine columns is very beautiful. Standing alone on this wide, low plain, the height and extent of the ruins are sure to be at first underestimated. "Those Greeks must have had big legs," was the comment of our guide as we climbed the three high steps which lead to the Temple of Neptune. These steps, as well as the broad platform at the entrance, are made of large blocks of gray lava. In the crevices between these blocks little fig trees have found a foothold. The Doric columns which rise above the platform number 6 on the two shorter sides and 12 on the longer sides; they are about 27 feet high. The architrave and the frieze are about 12 feet high, and the gable is nearly 9. Within this outer row of columns stands another, which defined the cella; these are 22 feet high and 6 in diameter. Upon their architrave rose a second row of columns of about half their size; of these, three remain on one side and four on the other. These upper columns formed the direct support of the roof of the peristyle and the side aisles of the cella, but not a fragment of the roof remains in place. It is not known positively where the image of the god stood.

Covered as the columns were to be, no attention was paid to the regularity of the length of the blocks of travertine of which they are formed, but the symmetry of the whole column is perfect.

The Basilica is a little smaller than the Temple of Neptune, the inner space inclosed by its columns being 79½ feet wide by 180 feet long. The outer columns are standing, but the cella is a complete ruin. Two fallen capitals, lying each with its abacus still attached, are in such position that one can stand beside them, and there one realizes for the first time how large those are which are still in place, and how lofty and massive are the columns which they surmount.

THE TEMPLE OF NEPTUNE, PAESTUM.

The third and smallest temple is Ceres; it is a short distance north of the others. The 34 columns of the peristyle are all standing; they are about 20 feet high and 4 feet in diameter at the base. Only a part of the front gable remains, and but four of the columns of the porch.

Many large blocks of stone lie within and about all the temples. We know that whole interior columns have been carried away to be used in other buildings. Those which remain show many evidences that time and animal life and human marauders have combined to make the temples shapeless ruins. There is inspiration in the fact that they have withstood such long-continued attacks of foes so resistless.—*From a Correspondent of the* Scientific American.

Wood Water Main.

A recent paper read before the American Society of Civil Engineers by James D. Schuyler, member of the American Society of Civil Engineers, on "The Waterworks of Denver, Colo.," contained some very interesting observations and figures relating to this subject. He states that sixteen miles of thirty inch wooden conduit was constructed in that work, in addition to a considerable length of forty-four inch pipe. The timber used was California redwood, and the thirty inch conduit was constructed to stand under a head of 185 feet. We understand from the paper named that the total average cost of the thirty inch pipe was $1 36 per lineal foot, of which about forty-eight cents constituted the cost of trenching and back filling. A gang of eight to sixteen men laid from 150 to 300 feet of the same size conduit per day. These mains were composed of staves dressed very smooth to cylindrical sides and radial edges, and were held to the cylindrical form by mild steel bands placed at a distance apart depending upon the head, but never exceeding seventeen inches. The pores of the wood are filled with the water under pressure, so that it oozes through to a slight extent, thus realizing the condition for permanent preservation. The pipe is framed in the trench, and all handling in full-sized sections is avoided; at the same time the interior finish is so smo th that the most advantageous conditions of flow are secured. Mr. Schuyler estimates that the use of these wooden conduits effected a saving of over $1,000,(00 in this particular work.—*Fire and Water.*

To make wood fireproof, it is boiled in tungstate of soda.

Artificial Marble.

M. Moreau produces an artificial marble from ordinary limestone in the following way: The stone is first carved into the required shape, and is then immersed in a bath of soap and a kind of varnish, which is floated on water and picked up by the stone. The stone is then immersed alternately in a bath of iron and copper sulphate, which permeates the body of the material, and when the absorption is complete the stone is immersed in hot water, which drives the coloring matter to the very heart of it. After this the stone is placed in a bath of zinc sulphate, and on being removed, after a few hours' immersion, is found to have the consistency and the specific gravity of marble. It is then dried in a warm chamber, after which it is ready for polishing.

ART MOULDINGS.

The perfection in the art of wood carving by machinery was aptly illustrated by the Grand Rapids Carved Moulding Co., of Grand Rapids, Mich., by its beautiful display of ornamental carved mouldings, at the World's Columbian Exposition. In this issue we illustrate one of the

designs, showing the application of these artistic mouldings. They are extensively used in interior finish, and all classes of woodwork where art is essential in the production of handsome designs. The company was given an award at the World's Fair for artistic design, clean, perfect work, and variety of patterns.

They are not pressed or mashed, but cut, leaving the grain perfect, and design as sharp and clear as handwork. The company also make rope and bead moulding, and balusters of any design, carrying in stock a large and well assorted amount of mouldings in all native woods, and cut to order in all the finer grades of imported hardwoods.

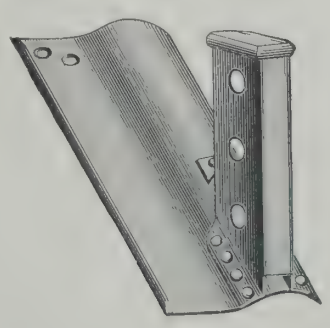
Their trade reaches all quarters of the globe, going largely to Europe. Their product is used in public buildings and State courthouse work, the company having recently completed a large order for the State capital building at Denver, Colo.

They produce the egg and dart, dental, and Grecian border mouldings, together with many other crown, base, and flat mouldings.

Their catalogue is ready for the trade, and will be mailed to architects, contractors, or woodworkers of any description, upon application to 7 Myrtle Street, Grand Rapids, Mich.

SNOW GUARDS FOR ROOFS, ETC.

The cut represents a style of standard to be used with slate, tile or shingle attached, complete and ready to receive the pipe or bar for a snow guard. The iron slate forms one of a course of slates, tiles or shingles, screwed to the roof planks, thus doing away with the cutting and fitting of the slate and flashing, or puttying around the standard as in the old method. In this method the standard, with the slate or tile attached, is as complete as any other placed upon the roof. The iron slates or tiles are placed about five feet apart at the eaves, or in



any other position on the roof, and can be made as ornamental as desired, so as to form a balustrade or safety guard, supports for signs or other structures on pitched roofs, being always perfectly water or snow tight.

The slate, with the standard, is simple in application, being as easily placed upon an old as upon a new roof, by removing one of a course of slates, tiles or shingles, and replacing it with the iron slate, which answers for a slate and support at the same time. These standards are made by M. Halliday, of 218 East Ninth Street, New York, of the best charcoal bloom wrought iron, and galvanized.

Double Tenoning by Machinery.

Up to a few years ago a double tenoning machine was not thought of for tenoning both ends of stock at one and the same time, as for sash, door and blind work, furniture work, etc. Manufacturers of woodwork, and those who have large quantities of tenoning to do, now appreciate the importance of the double tenoning machine. The tenon is cut on both ends at one operation, making the tenons perfectly parallel, every piece exactly alike, thereby saving time and doing much better work than can be done on the single tenoning machine. This machine also takes the responsibility from the operator, because the stock when placed on the traveling bed is carried to the cutter heads in a rigid position, securely clamped, so that no care or attention is required by the operator. After placing the stock on the bed, the machine does the rest of the work. The latest improved machine of this character is made by the Egan Company, of Cincinnati, Ohio.

Transparent Bricks for Hothouses.

Experiments with glass building bricks were begun in 1891 by M. Falconier, an architect of Lyons. These bricks are hollow, being blown like bottles, and are given forms, such as cubes, hexagons, etc., that permit of ready laying. A bituminous cement, with a base of asphalt, is used with them. The bricks serve as double windows, giving protection against both cold and heat; they are good insulators of humidity and noise, and they lend themselves readily to the decoration of buildings, either by their form or color. Many applications are foreseen. The bricks are neater than marble in meat markets, and especially adapted for bath halls, hothouses, hospitals, refrigerating establishments, and buildings in which absence of windows would be an advantage. A hothouse of glass bricks is of about ordinary cost, saves fuel, and resists hail.—*Ashton (England) Reporter.*

THE GLUTOL manufactured by the Arabol Mfg. Co., 13 Gold St., New York, is designed to have all the valuable properties of glue for sizing kalsomine and make wall size, and none of its bad qualities. It is made in a semi-liquid form, and can be thinned with cold water and made ready for use as readily and quickly as one can thin a pail of flour paste. It has no disagreeable smell; a pail of kalsomine or wall size made one day will be good the next day, and flies of all kinds positively decline to go near it.

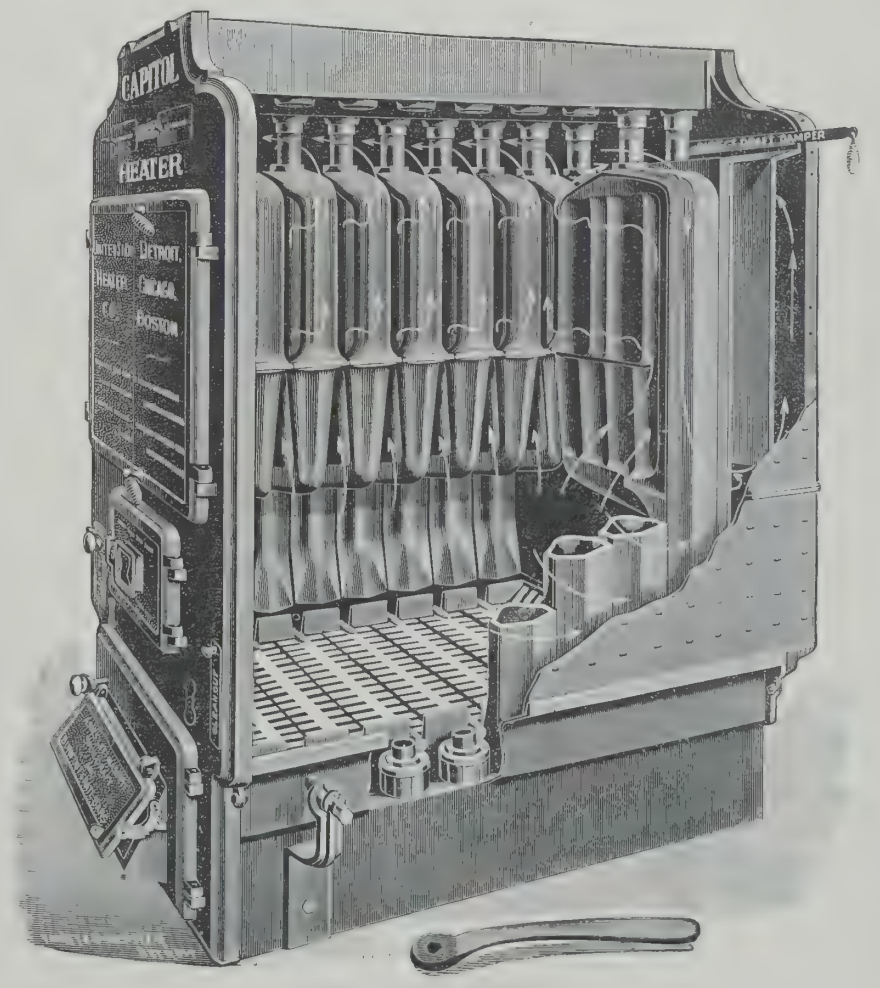
THE CAPITOL HEATER.

The United States Heater Co. have been developing their well-known Capitol Hot Water and Hecla Steam Heaters in the direction of larger sizes, and the illustration shows their Capitol Heater of the Four Hundred class. The Four Hundred Capitols differ from the smaller sizes in that the sections nowhere meet at their lowest point directly above the firepot, but for half their height are exposed to the direct action of the radiant heat from the fire. This makes the surfaces self-cleaning, and gives them the superior effectiveness of direct surfaces. A cast-iron casing has been added to this heater, forming a return flue between the casing and the sections. The heat is thus compelled to traverse the entire outer surface of the sections, largely increasing the heating surface of the boiler. This casing is coated with asbestos, to prevent loss of heat by radiation. The boiler can be brickset if desired, but the manufacturers recommend the casing. The front of this heater is not a water section, but a plate casting, which is heavily lined where the fire strikes it. The section of this front, just below the fire door, can, if desired, be replaced with a small water-front like the water-front of a kitchen range. This is useful for supplying water for domestic purposes. These features are combined with the perfect vertical circulation and lateral draught that have given the Capitol its reputation, and a large number of these Four Hundred Heaters have been sold this season for use in schools, hospitals, large residences, etc.

The company, wherever it is desired, make for their agents elaborate detailed working drawings, showing how everything pertaining to the job should be placed to insure the economical erection of the plant and its effective and economical operation. The Hecla Steam Heater has also been extended into the Four Hundred class, and is practically the same thing as the Capitol, with only the necessary modifications of the interior section, providing for liberating surface and steam chamber, and the addition of the ordinary steam trimmings.

In addition to their Capitol and Hecla Heaters, this company manufacture the little Mascot Heater, for both water and steam, for heating small residences and flats, and furnishing water supply for baths and domestic purposes.

The Factory and Head Offices of the United States Heater Co. are at Detroit, and they have a branch at 100



THE CAPITOL HEATER.

Lake Street, Chicago. Gilchrist & Taylor, 106 High Street, Boston are the New England sales agents; and the New York salesman, Mr. Saunders, makes his headquarters with Janes & Kirtland, 110 Beekman Street, New York.

GEORGE POPPERT'S PATENT IMPROVED WEIGHT SLIDING BLINDS.

The ideal of a perfect inside sliding blind, practical in every detail, is sought to be attained in the latest product of Mr. George Poppert, of Milwaukee, Wis. They are made with a guideway or slide, size 3½ x 1 5-16 inches, which acts as window stop, and is so arranged as to receive the metal strips connecting blinds with guideway, and at the same time covers the lead weights, ¾ x 5-16 inch in size, balancing the blinds.

Fig. 1.

To avoiding any noise in operating, glass pins are used, over which the cord slides (see Fig. 1), This guideway can be attached to any window in old as well as in new buildings, and the frames do not need to be especially prepared to fit the guideway, as the guideway is arranged to fit any frame n any house.

Figure 2 shows guideway and blind connected by metal strip, and Figure 3 shows front view of same. The cord is attached to blind by means of a plug, Figure 4. By the use of metal strips several points of great advantage are gained. The blinds will work smooth and easy under all circumstances, and never stick. A blind 6 feet wide will work as freely as one 2 feet in width, and by means of the strips the blind can be taken out of window in a minute's time to be cleaned. A turn of the screw holding down the metal strip will loosen the strip, so it can be drawn out of its groove in guideway. A motion of the hand takes out the plug holding cord, and the blind can be taken away. The cords are prevented from slipping into weight boxes by the plugs at their ends.

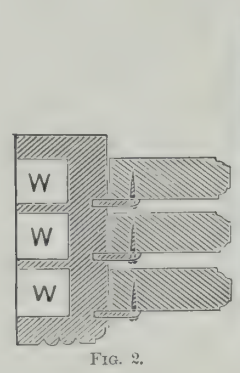


Fig. 2.

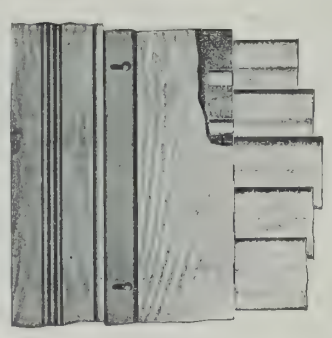


Fig. 3.

Fig. 4.

The improvement made in the blinds is based principally on a change made in the construction of the guideway, the blinds now being held in place by metal strips, and running far smoother than if the blinds would run direct in grooves. Wood sliding in wood is always more or less subject to swelling caused by moisture. With metal strip attachment, the blinds are not affected by the weather.

Figures 5 and 6 show section drawings of frames, with sliding blinds attached.

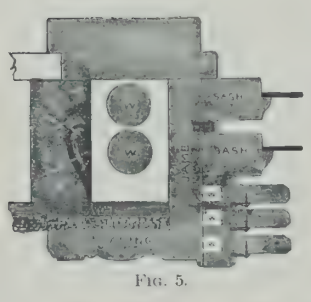


Fig. 5.

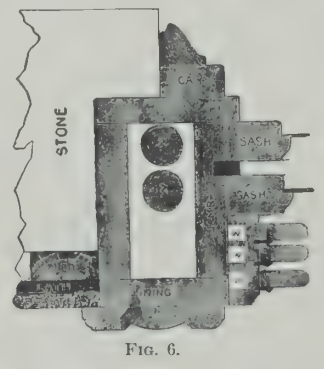


Fig. 6.

Mr. George Poppert manufactures also a blind especially made and suited for the Southern climate. The slats in these throughout the entire blind are made movable by means of brass rods fastened to both ends, and in this way perfect ventilation as well as shade can be had.

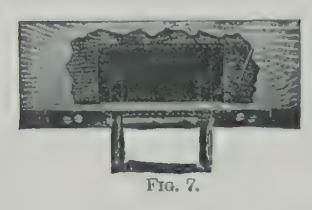


Fig. 7.

Fig. 8.

Figures 7 and 8 show an improved form of drop and lift handle.

The New Decorations in the Apse of St. Paul's.

The spandrels of the inner dome of St. Paul's, London, were decorated with Salviati glass mosaic, in designs by Watts, Stevens and Brittan, the time consumed being thirty-one years. These mosaics are by W. B. Richmond. Nineteen spaces, great and little, have been embellished with mosaics at a cost of $60,000, and at least as much again will be needed to complete the choir.

Preparing Walls for Papering.

The following rules are for the scraping and treatment of walls of various kinds preparatory to papering:

If walls have been previously papered, it is advisable to scrape off old paper, not only from a sanitary standpoint, but also to insure a perfect job. Paperhangers cannot be too vigorous in advising customers to have walls and ceilings scraped previous to repapering.

To remove ordinary wall paper, soak the paper by applying hot water with an old brush, and then scraping with hand or pole scraper.

Heavy papers, such as leathers and felts, should be treated to a coat of hot paste, thinned down to the consistency of cream. After a few minutes' soaking remove by scraping.

Whitewashed walls should be scraped after thoroughly wetting the walls with thin paste or water, then size with strong sizing. If whitewash is not thick or scaly, a strong solution of vinegar will answer all purposes.

For damp walls we advise either one, two, or three coats of shellac over the damp surface; or tinfoil, which is put up in sheets, can be tacked and pasted over the damp spots.

For varnished paper, mix about two pounds of common brown sugar or molasses to one-half bucket of water, then apply like sizing. This mixture is also good for oil-painted walls. Scraping, however, is preferred to either.

For oil-painted walls, dissolve two pounds of pearlash in a bucket of water, and apply like sizing.

For kalsomined walls, wash walls and ceilings with a large sponge, then apply ordinary sizing. New walls should have a coat of weak sizing.—*Builder and Wood Worker.*

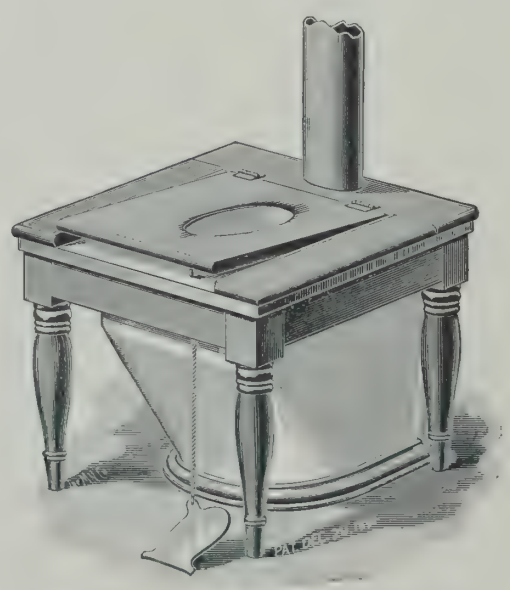
AN IMPROVED CARPENTER'S CLAMP.

The new steel carpenter's clamp shown in the illustration is for use in clamping up doors, counter-tops, or any work which requires holding under pressure while the glue is drying or in being put together. The bars are made of a quality of steel rolled especially for the purpose. They are notched on the lower side, which gives a much greater holding power to the loose jaw than where the notches are placed on the upper side of the bar. The screw is made of wrought iron, with a machine cut thread. The crank is malleable. These clamps are made by Messrs. E. C. Stearns & Co., of Syracuse, N. Y., in two thicknesses of bars, and in lengths of 3, 4, 5, 6, 7, 8, 9, 10 feet.

AN IMPROVED CARPENTER'S CLAMP.

AN IMPROVED SANITARY APPLIANCE.

The illustration represents a simple and effective provision for a common necessity in all places lacking a water supply and sewerage system. It is made to operate automatically by the weight of the body, the hinged seat then pressing upon a knob which moves an air-tight seal.



AN IMPROVED SANITARY APPLIANCE.

The improvement is designed to afford absolute cleanliness, absence of odors, and a perfect system of ventilation when not in use. It is manufactured by the Sanitary Appliance Co., of Guilford Avenue and Oliver Street, Baltimore, Md.

HUGHES' IMPROVED DRAWING TABLE.

This table, of which Mr. Henry J. Hughes, of No. 360 Forty-fifth Street, Brooklyn, N.Y., is the inventor, possesses several novel features designed to promote the convenience and comfort of the draughtsman. The board is readily adjustable, by means of thumbscrews at the front, through a vertical range of six inches, and it can be tilted from a horizontal position to a nearly vertical one by simply raising the rear portion to any desired angle, the board being automatically locked in the position in which it is placed by depending supports which slide through angular openings in rearwardly extending pivoted arms. The arms are connected by a horizontal rod, and when they are slightly raised the board may be lowered from either end of the stand. The pine drawing board is held in an oak ash or frame, in three edges of which is a groove for an endless wire, carried by sheaves in each corner, and a parallel ruler, clamped by spring clips, may be moved with ease and accuracy across the board, and readily set at any angle.

A NEW DRAWING TABLE.

Ice-cutting is a new industry in the Adirondack region, the pure lake water and the severe winters making ice of excellent quality. One railway line cuts across a corner of a considerable lake, and ice is cut at that point by the hundred tons, and shipped by rail to storehouses in the region to be supplied.

HELPING THE DEAF TO HEAR.

The device shown in the illustration is readily inserted in the ear; can be worn with comfort and without injury, and has been found to be effective in restoring hearing in all stages of deafness. The device can be inserted and taken out in an instant, is entirely invisible when in position, and remains in place without being held by the hand. It consists of an artificial drum cushion, very thin, delicate and elastic, doing the work of the natural drum-head, and inserted and placed in position by means of a tubular handle, a tubular extremity admitting air and sound waves, and preventing overheating and friction.

THE HISCOX TUBULAR EAR DRUM.

The device is designed primarily to support, build up, and aid a defective or diseased natural ear drum, and is based upon a thorough scientific acquaintance with the anatomy of the ear.

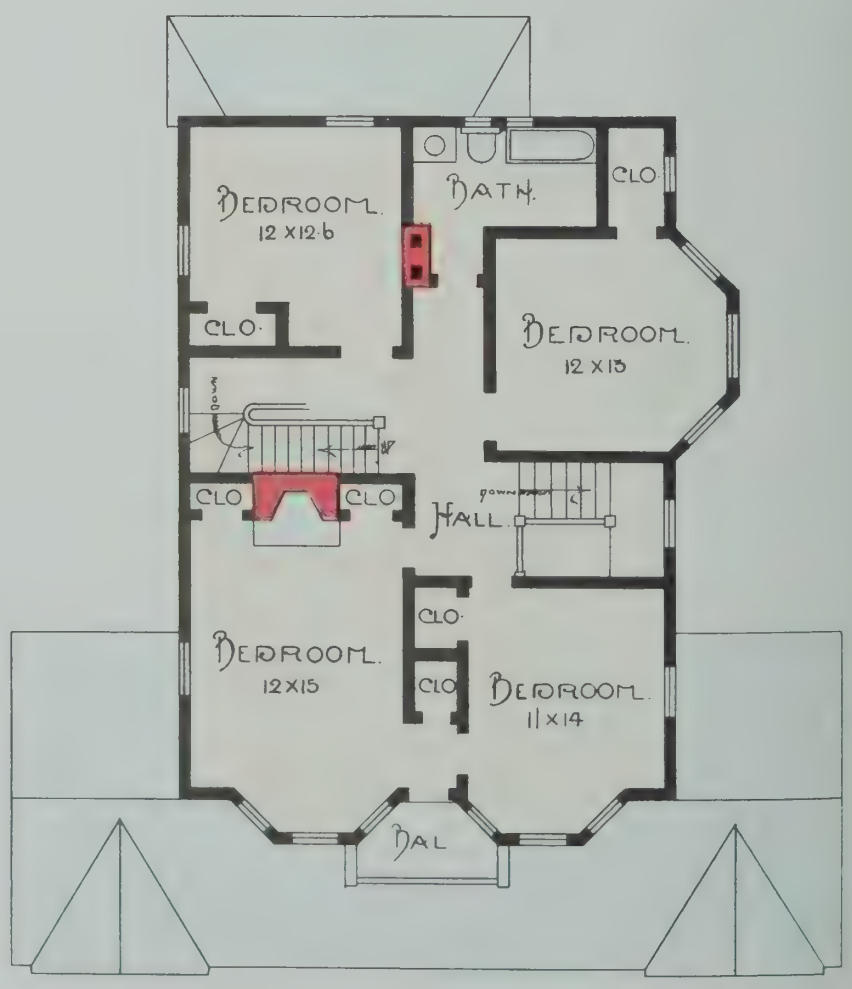
The auditory passage is a tube until the drumhead is reached, and these drums, besides being a remedy for ordinary deafness, are also a protection for sensitive ears against cold draughts of air, concussions in boiler shops, dust in mills, etc., being sometimes worn for this purpose only after good hearing has been restored.

The expense of the article is very small.

A pamphlet giving full particulars will be sent to those who apply to the manufacturer, Mr. F. Hiscox, No. 853 Broadway, New York.

A RESIDENCE AT BENSONHURST, N.Y.

FIRST FLOOR.



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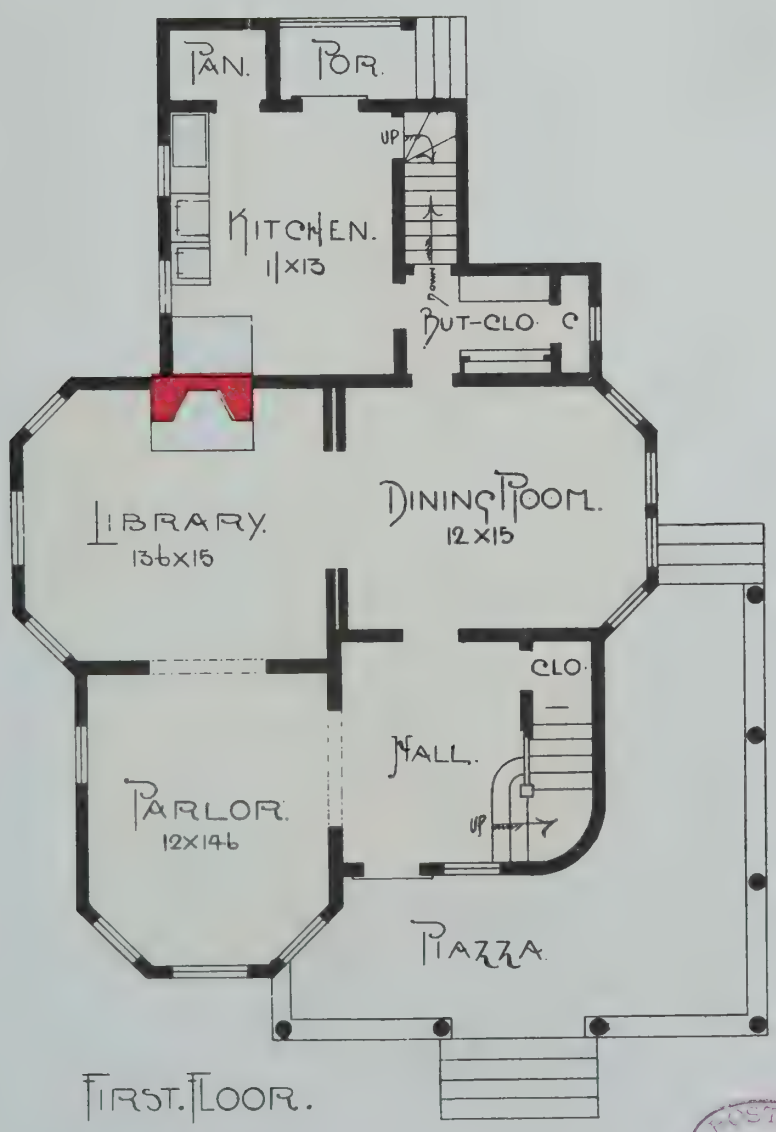
A COTTAGE AT BRONXVILLE, N.Y.



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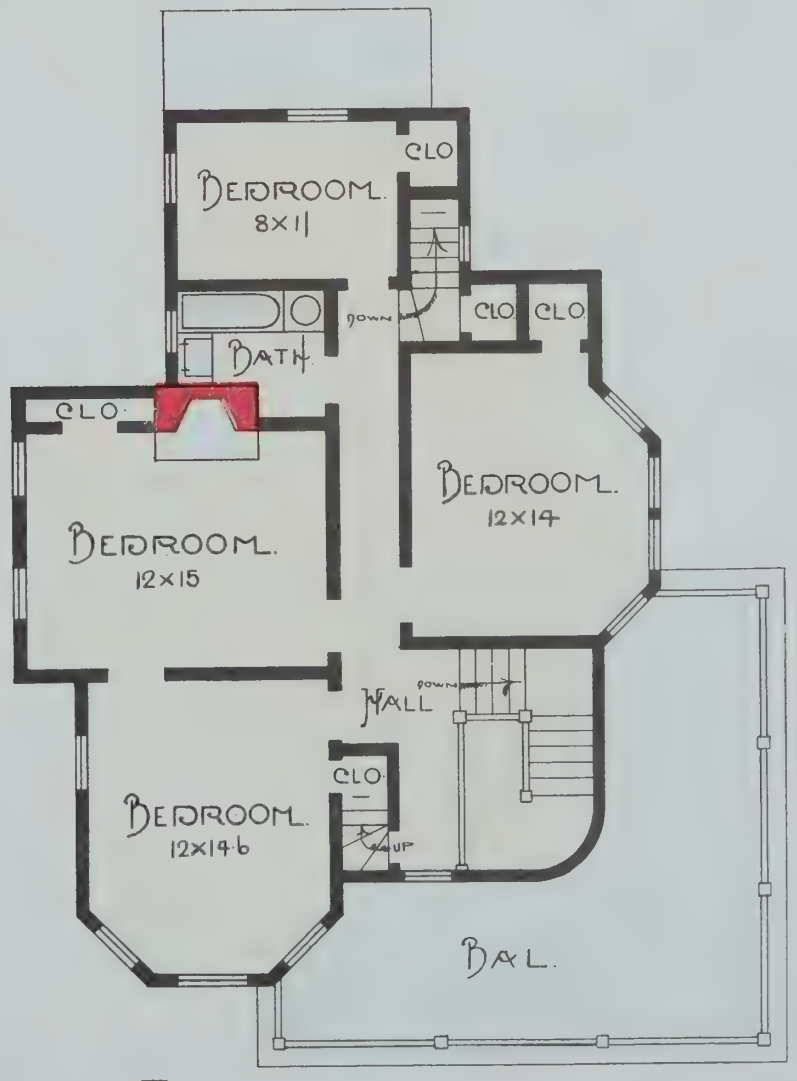

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SCHUMACHER & ETTLINGER, NEW YORK

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A COTTAGE AT BRONXVILLE, N. Y.--See page 66.

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NEW YORK, NOVEMBER, 1894.

THE

Scientific American,

ARCHITECTS AND BUILDERS EDITION.

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Of the November number of the ARCHITECTS AND BUILDERS EDITION of SCIENTIFIC AMERICAN.

(Illustrated articles are marked with an asterisk.)

A COTTAGE AT BRONXVILLE, N. Y.

We give as the subject of one of our plates in colors a cottage at Armour Villa Park, Bronxville, N. Y., which was recently erected for B. L. Clark, Esq. An additional view will be found on page 65. The elevations are designed in the modern style, and the convenience of the various apartments, and their respective privacy, are apparent. The underpinning is built of rock-faced local stone, laid up at random. The building is sheathed, and the first story is clapboarded, while the second is shingled. It is painted Colonial yellow, with ivory-white trimmings. The roof is shingled and stained moss green. Dimensions: Front, 32 ft.; side, 47 ft., not including porches. Height of ceilings: Cellar, 8 ft.; first story, 9 feet; second, 8 ft. 6 in; third, 8 ft. The interior throughout is trimmed with whitewood. The doors and windows have neatly moulded casings. The hall is finished in antique oak. It contains an ornamental staircase ash, with spindle balusters, newels and rails, finished similar, and it is lighted by stained glass windows with good effect. Parlor and library are finished in cherry, and each are provided with transoms, filled in with spindlework. Library contains an open fireplace, built of brick, with tile trimmings and a hardwood mantel. Dining-room is finished in oak, and is provided with a large butler's pantry, furnished with dressers, shelves, drawers, and closet. The kitchen and pantry are trimmed and wainscoted with North Carolina pine, finished natural, and provided with the usual fixtures complete. The second floor is trimmed with similar wood, and it contains four bedrooms, large closets and bathroom, the latter wainscoted and fitted up complete. Floors of North Carolina pine. The third floor contains one bedroom and ample storage. Cemented cellar contains furnace and other apartments. Estimated cost, $5,000. Mr. William A. Lambert, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT BENSONHURST, N. Y.

We publish in this issue, as a subject for one of our colored plates, "Rose Lawn," the residence of John Cottier, Esq., at Bensonhurst, Long Island. Additional views of the house, also the stable, are given on pages 76 and 77. The design presents a good example of Colonial architecture, and it has good elevations, with pleasing bits of detail and excellent plans, conveniently arranged and finished in a handsome manner. The underpinning is built of brick, laid up in red mortar. The superstructure above is covered on the exterior with clapboards, and painted Colonial yellow, with ivory-white trimmings. Roof shingled and finished natural. Dimensions: Front, 31 ft.; side, 46 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The vestibule is paneled and trimmed with oak. Hall is also trimmed with oak, and it contains an ornamental staircase, with carved newel, balusters, and rail. It is lighted by a stained glass window at first landing, shedding a pleasant light over upper and lower halls. The floors are laid with oak. The doors and windows have heavy moulded casings with caps. Parlor is trimmed with mahogany, and is provided with a bay window and a nook, containing fireplace, furnished with tiles and mantel, with mirror. Dining-room is trimmed with oak, and it contains a similar fireplace, with tiles and mantel. The pantries and kitchen are trimmed and wainscoted with yellow pine, finished natural, and provided with the usual fixtures complete. The second floor is trimmed with cherry, and it contains four bedrooms, large closets and bath. Bathroom is wainscoted and furnished replete. The third floor contains a large billiard-room, three bedrooms and trunk-room. Cemented cellar contains furnace, laundry, and all necessary apartments. Cost $6,750 complete, exclusive of interior decoration. Messrs. Parfitt Bros., architects, 26 Court Street, Brooklyn, N. Y.

Our engravings were made direct from photographs of the buildings, taken specially for the SCIENTIFIC AMERICAN.

DWELLING AT EDISON PARK, ILL.

We illustrate on page 68 of this number a pretty dwelling at Edison Park, Ill., built from plans and specifications made by Architect F. W. Langworthy, 638 Congress Street, Chicago. Dimensions: Front, 26 ft; depth, 30 ft., not including porch; porch, 7 x 26 ft.; balcony, 7 x 18 ft. Cellar under all the house, divided for laundry, furnace, coal, storage, etc. Cellar, 7 ft. 2 in.; first story, 9 ft. 2 in.; second story, 8 ft. 6 in. Large attic, with ample space for three rooms. Parlor, 12 x 16 ft., with handsome wood mantel, and wide grille openings to both hall and dining-room. Dining-room, 14 ft. 4 in. x 14 ft. 6 in.; pantry, 4 ft. 4 in. x 8 ft. 6 in; kitchen, 12 x 13 ft., with inside cellarway. Boiler, sink, and force-pump to tank in attic, which provides the dwelling with its own water system. Second floor has three large bedrooms, 12 x 14 ft., 11 ft. 2 in. x 12 ft., and 12 x 13 ft.; two dressing-rooms, 6 ft. 2 in. x 8 ft. and 6 x 9 ft., and bathroom, 6 ft. 6 in. x 8 ft. Bedrooms each have large closets. Hall trimmed with oak, and both floors with yellow pine, oil finished. Roof painted slate color. Body color, bottle green; gables, moss green; corner boards and trim, very light green; porch and balcony floors, dark brown. This design is a model for its class and cost, and combines a very attractive exterior with a convenient and well arranged interior, which well meets the requirements of a small family. Cost, not including furnace or furnishings for bathroom, $1,700.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT FLATBUSH, N. Y.

We publish on page 70 a very attractive residence recently erected for A. C. Garsia, Esq., at Flatbush, Long Island.

The design is treated in a modern style, and is a combination of pleasing elevations, well arranged plans, and handsomely furnished apartments. The underpinning is built of rock-faced stone, laid up at random, with brick jambs. The superstructure above, of wood, is sheathed, clapboarded, and painted a slate gray color. Dimensions: Front, 50 ft.; side, 43 ft., not including piazza and porch. Height of ceilings: Cellar, 8 ft. 6 in.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The hall is trimmed with ash. It is provided with a lobby, with Dutch doors, heavily bolted together; a pleasant nook, with seat, and a large, open fireplace, trimmed with tiled facings and hearth, with wrought iron trimmings, and a mantel of Colonial style, with columns and mirror. The staircase is the most striking feature, and is built in an artistic manner. It has carved newel posts, spindle balusters, and a broad landing, with a cluster of windows and a paneled divan. The arcaded effect between hall and library is a good feature. Hall has a paneled wainscoting. Drawing-room is treated in China white and gold, and it has a nook with seat, and separated by a spindle transom, and fireplace furnished with onyx tilings and mantel. Music room is finished in cherry, and it has a bay window, fireplace, and windows opening out upon porch. Library is also finished in cherry. Dining-room, finished in oak, contains an alcove for buffet, with a stained glass window, and fireplace, with mantel and tile trimmings. The floors are of hardwood. Butler's pantry is fitted up in the best possible manner, with bowl, dresser, drawers, shelves and dumbwaiter. Second floor contains five bedrooms, large closets, and bathroom; and third floor is provided with two servant bedrooms and two trunk rooms. Bathroom is wainscoted, and furnished with all necessary fixtures. Cemented cellar contains kitchen, laundry, pantries, furnace room, and other necessary apartments. Mr. John E. Baker, architect, Newark, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

AN EIGHT HUNDRED DOLLAR COTTAGE.

On page 74 we publish a cottage built for A. R. Doten, Esq., in Casco Bay, near Portland, Me. The building is designed for a summer home, and is built on cedar posts with stone footings, while the exterior framework throughout is sheathed, covered with shingles, and stained sienna, with bottle green trimmings. The roof is also shingled, and painted red. The cellar is inclosed same as building above, and is lighted and ventilated by latticed windows. It has an entrance on the exterior. Dimensions: Front, 26 ft. 6 in.; side, 27 ft. 6 in., not including piazza which is a good feature, broad and spacious. Height of ceilings: Cellar, 6 ft. 6 in.; first story, 8 ft. 6 in.; second, 8 ft. The first floor contains a large living room, with an open fireplace, built of brick, with hearth of same, and provided with a neat wood mantel; dining-room has a stained glass buffet window, large pantries and kitchen, furnished with the necessary fixtures. The staircase in living room is turned out of spruce. The second floor contains four bedrooms, closets, and storage. The interior throughout is sheathed ceiled, and trimmed with clear white spruce, finished natural. The floors are laid with yellow pine in narrow widths. Cost $800 complete. Mr. Antoine Dorticos, architect, Portland, Me.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT BENSONHURST, LONG ISLAND.

We illustrate on page 72 a residence recently completed for George W. Catt, Esq., at Bensonhurst, Long Island. The design is very picturesque, and it combines both ornamental and attractive elevations, and plans conveniently arranged and finished in a handsome manner. The spacious and well shaded piazza, bay windows, balcony and tower are the principal features of the exterior. The underpinning and balustrade to piazza are built up with local, well burned brick, and is laid in red mortar. The building above is built in a thorough, substantial manner. The first story is clapboarded and painted olive yellow, with ivory-white trimmings, and the second and third stories are shingled and stained sienna. Roof is shingled and stained a mottled brown. Dimensions: Front, 42 ft. 9 in.; side, 44 ft. 6 in , not including front piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft. 6 in.; third, 8 ft. The column, spindle transoms and ornamental staircase are the features of the hall, while the bookcases, alcove and open fireplace are the features of library. Both apartments are trimmed with oak, and have massive moulded casings. The staircase is lighted effectively by delicate stained glass windows. Parlor is trimmed in a handsome manner with whitewood, and is treated in ivory-white and gold. The chimney breast is furnished with tiled trimmings, and a dainty Colonial mantel, with columns and mirror. The archway between hall and parlor forms an open effect. The fireplace in library is provided with a tiled hearth and facings, and a hardwood mantel, carved and provided with mirror. Dining-room is also trimmed with oak, and provided with a buffet, built in with leaded glass doors, and an open fireplace, built of Tiffany brick, and with hearth and facings of same, and mantel of oak. The conservatory is well lighted, heated and ventilated; it has a tiled floor and wainscoting. Kitchen is trimmed with cypress, and also pantries and rear stairway. These apartments are wainscoted and fitted up with the usual fixtures complete. The chimney breast, back of fire-hearth and range, is faced with white enameled brick. Second floor is trimmed with whitewood, and finished in cherry. It contains four bedrooms, closets, study and bath, the bath wainscoted with tiles and fitted up with porcelain tub, etc. The third story contains billiard room, servant's bedroom, trunk room, and outlook in tower. The floors in halls and dining-room are laid with oak in narrow widths, and highly polished; other floors are laid with yellow pine. Cemented cellar contains laundry, furnace, storage cellar, inclosed with brick walls, and other necessary apartments. Cost $8,100 complete, contract price. Mr. S. S. Covert, architect, New York, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

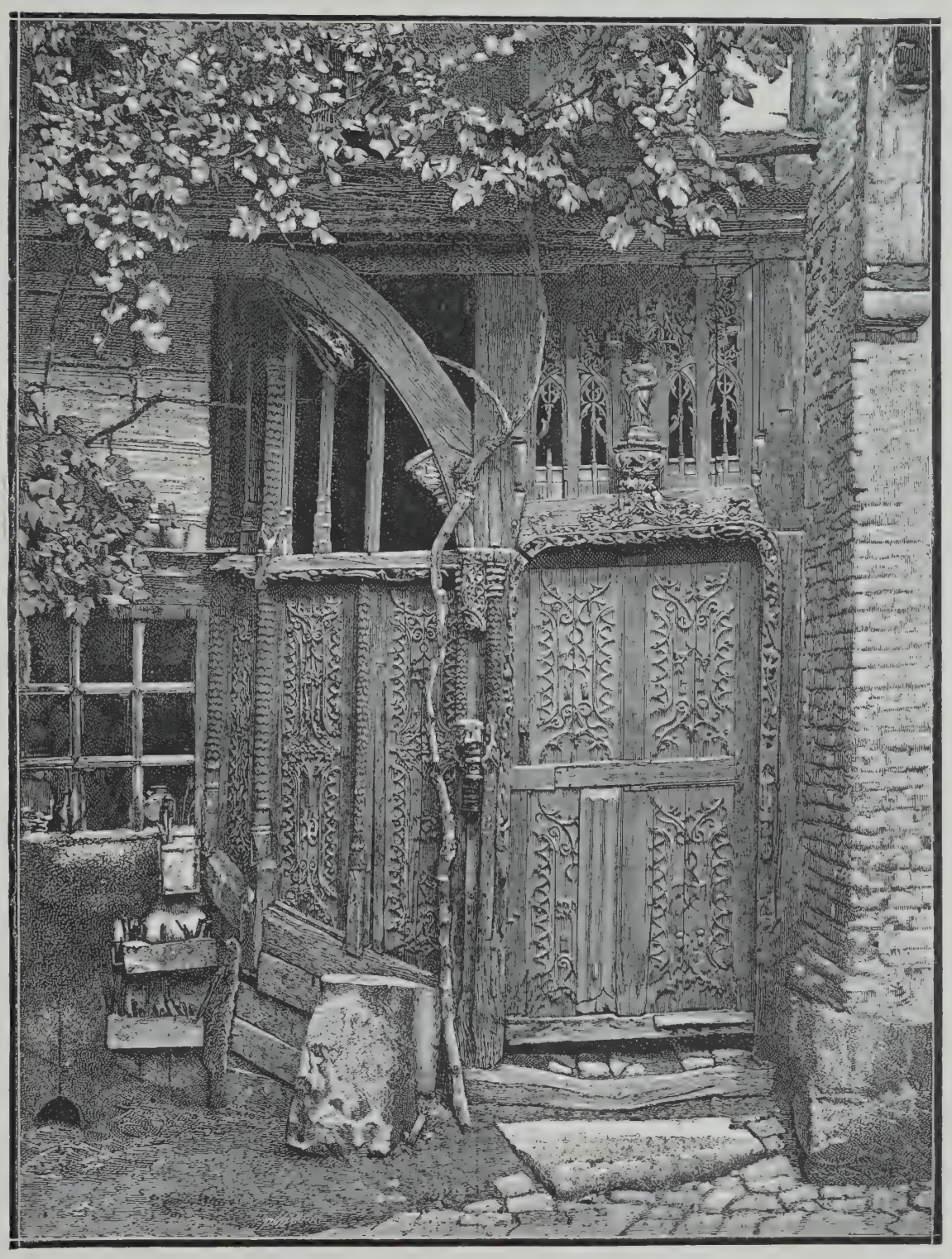
A CHURCH AT SHORT HILLS, N. J.

This church, shown on page 75, is built entirely of rubble stone, roughly squared at angles, the voussoirs and jambs of windows being dressed local stone; the copings and caps of two small pinnacles, forming belfry, being also of dressed stone. The roof is constructed of heavy truss beams, with hammer trusses, the timbers being dressed, and exposed to view. The exterior is covered with narrow blue slates, flashed with zinc, and laid six inches to weather. In the interior, a heavy arch separates the sanctuary from the body of the church. On the left is the vestry room, well lighted, with large, open fireplace in the angle. Entrance is through passage from rear door. The organ occupies a convenient recess, leaving sufficient room for the choir in view of the congregation. The walls are plastered to the truss plates, and wainscoted to the window sills of wood, with neat cap and base mouldings. The plastering is painted a bright vermilion red. The estimated cost is $6,000. The architects were Lamb & Rich, of New York.

THE HOUSE OF FRANCIS I. AT ABBEVILLE.

The use of carved wood in the ornamentation of houses was, in the fifteenth century, in general use in the north of France, and the western part of it, Normandy and Brittany, possessed works of art of admirable execution and of a very elevated and artistic feeling. Rouen, Lisieux, Lanion, and so many other cities in which this art has left traces of incomparable elegance, offer our decorators perfect models that leave to their initiative a free latitude to take inspiration therefrom without tying themselves down to the making of servile copies. Abbeville is among the best provided of the artistic cities of France. To speak only of carving upon wood, the church of Saint Wolfram has a porch whose wooden door is very curiously ornamented. It represents the Virgin and the twelve apostles. The reredos of Saint Paul, a triptych representing the marriage of the Virgin, the annunciation and the nativity, is a piece that it would be impossible to pass over in silence; and the religious structures of Abbeville possess other specimens of this epoch, in which the national art shed its splendors with profusion ere it disappeared before the intrusion of Italian art. Civil architecture likewise covered itself therewith, and with the more haste, it seems, in that the end of these admirable works was already felt to be at hand. Their condemnation had been pronounced and put in execution by George d'Amboise. It is necessary to be thankful to Francis I. and his successors, however, for not having destroyed the structures erected by French art, and for not having entirely sacrificed to the Italian taste the admirable works in which the national soul had poured itself out. Thanks to this circumstance, comparison and discussion can now be established between the free Gothic expansion and the Latin formula, a work to which Mr. Courajod, the eminent conservator of sculpture at the Museum of the Louvre, has devoted himself, and for which he is not alone in fighting. To tell the truth, the provincial mind has always been faithful to that feeling of protection of works anterior to the Italian Renaissance, that is to say, of our true artistic patrimony. The passionate solicitude with which the majority of the archæological societies watch over these treasures has been their safeguard, and it is in this that we are still to find manifestations of art that are characteristic of us, a direct emanation, and without mixture, of the national soul. Thanks to it, elevated minds can now hope that French tradition will be renewed, and that our country will re-enter into the possession of an art that in the future will permit it to be no more denuded of artistic riches than are the other peoples of Europe and those of Asia.

These reflections are applicable to all the works, large or small, that the last four centuries have allowed to endure—to the cathedral as well as to the piece of sculpture ornamenting the door or the gable of a house. Alongside of Saint Wolfram, the stairway of what is called the house of Francis I. has its importance, in that it also is an authentic witness of the decline of Gothic art.



HOUSE OF FRANCIS I., AT ABBEVILLE.

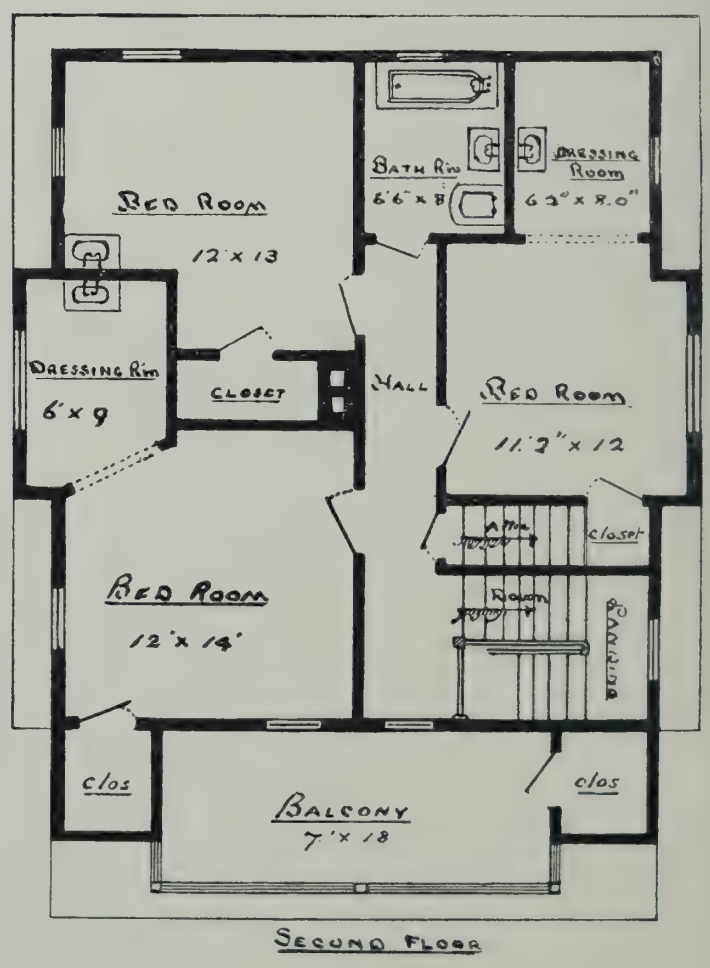
According to Mr. Ris Paquot, an archæologist to whom the riches of Abbeville are familiar, this stairway is not in the place that it first occupied. It must have formerly belonged to one of the faces of an anterior structure, the substructures of which still exist, and must have given access to the upper stories. We must, therefore, have before us the lower part, with the regret that we cannot determine what the crowning was.

Our engraving represents the entrance door of the stairway and a portion of the case. The sole leaf of this door is divided into four panels, of a decoration formed of the apposition of two ogee arches. In the centre we remark some figures formed by a crossing of letters connected by a funicular ornament. Mr. Ris Paquot sees therein the following couplings in Gothic letters: ny, ps, by, or hy, upon the panels of the staircase as well as upon those of the door. The funicular ornament, according to him, must relate to the order of chivalry created by Anne of Brittany in memory of her father, Francis II., Duke of Brittany, and designed especially for maidens and widows.

The door is framed with carved jambs, and with a lintel in the ornamentation of which appears the ogee arch. The finial of this arch carries a handsomely worked pedestal, upon which stands a statue of the Virgin. This motif terminates in a canopy of an openwork flamboyant style, and rests upon an impost of the same decoration. At the left of the impost springs a corbel provided with a canopy like the first.

The case of the stairway exhibits three panels, ornamented, like those of the door, with figures, ogee arches, and festoons. They are separated by small columns, of exquisite delicacy. Only three of these columns are visible, the others being hidden by the façade of a house standing in a sort of vast passageway. We are not certain as to the reason why the name of Francis I. is attached to this house. He made various sojourns at Abbeville, both when he was yet merely Duke of Angoulême and after he had become King of France. Everything leads to the belief, however, that the house at which he stopped has entirely disappeared, and that this stairway alone legitimately consecrates the memory of the king in this part of Abbeville, if it really belongs to the house that has disappeared. The name under which it has been preserved has certainly a *raison d'être* that it belongs to archæologists to discover.—*Le Magasin Pittoresque.*

THE average weight of smaller sized bricks is about four pounds; of the larger, about six pounds.



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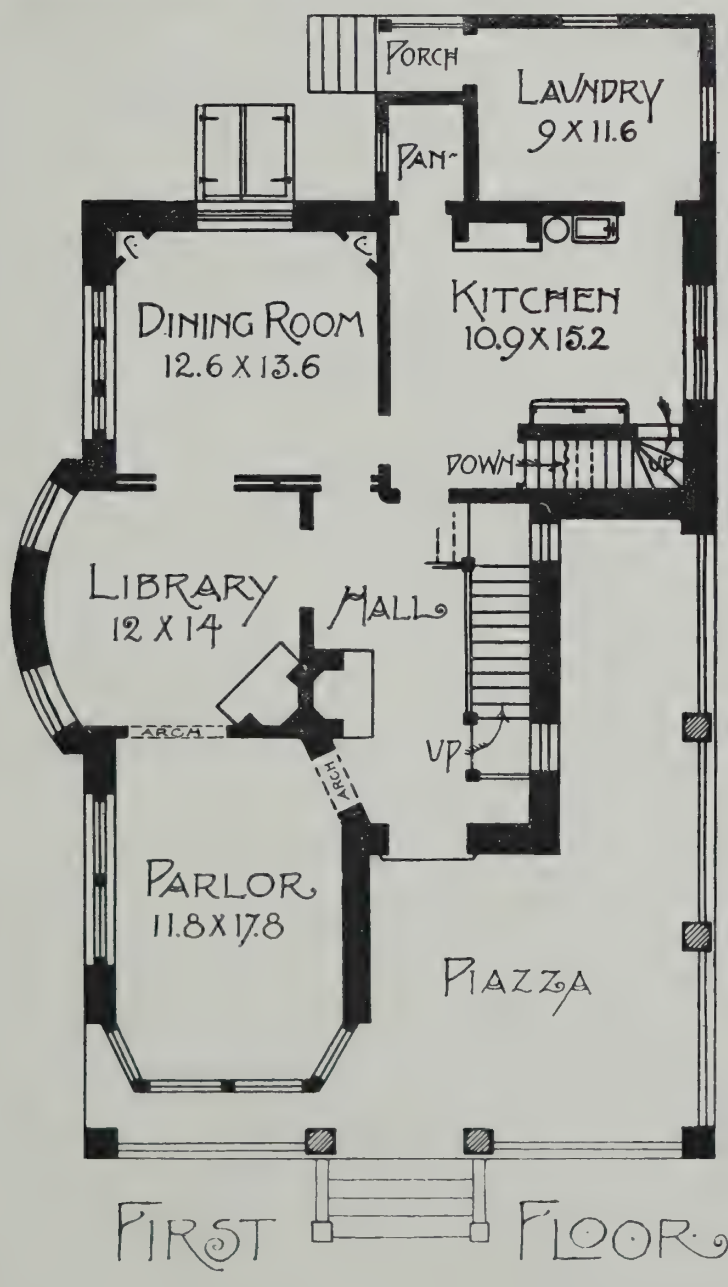

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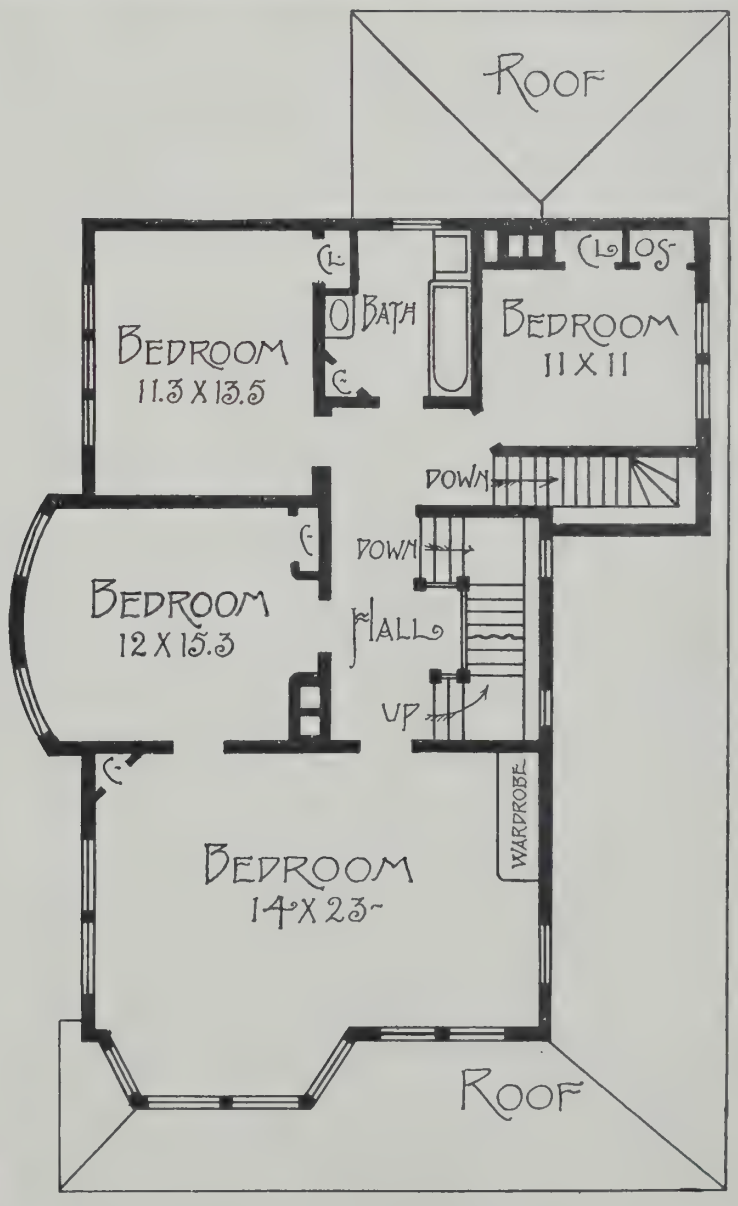

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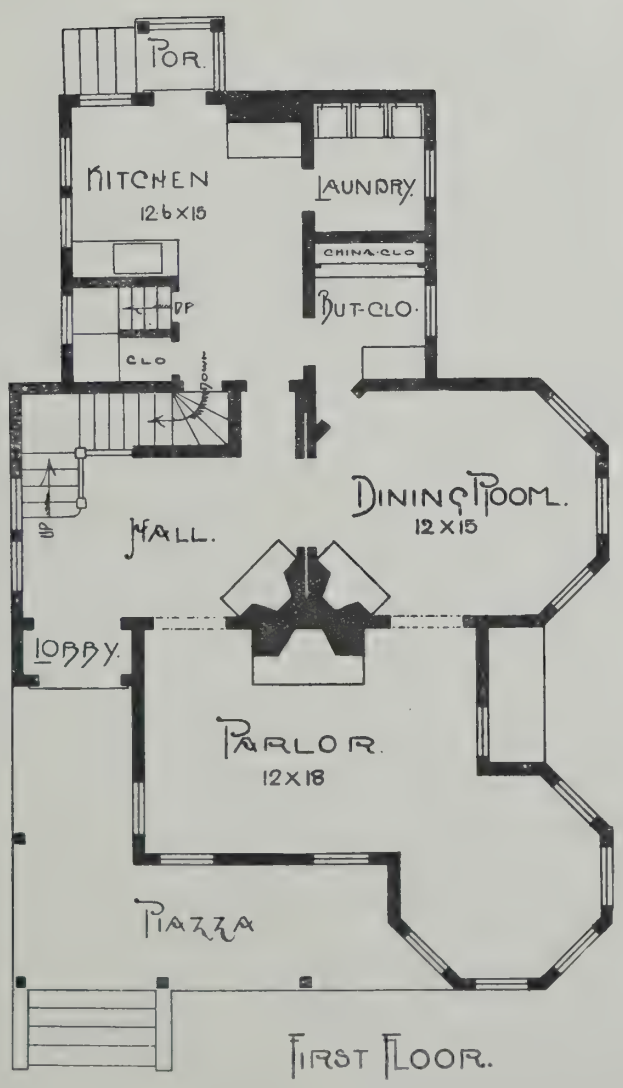
A COTTAGE AT FLATBUSH, N. Y.—See page 66.



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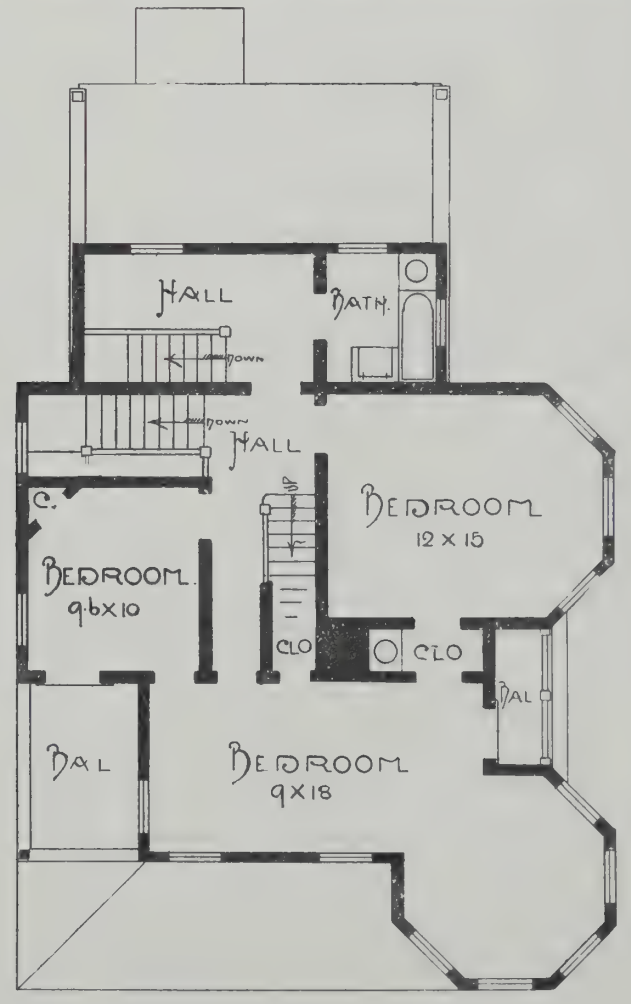

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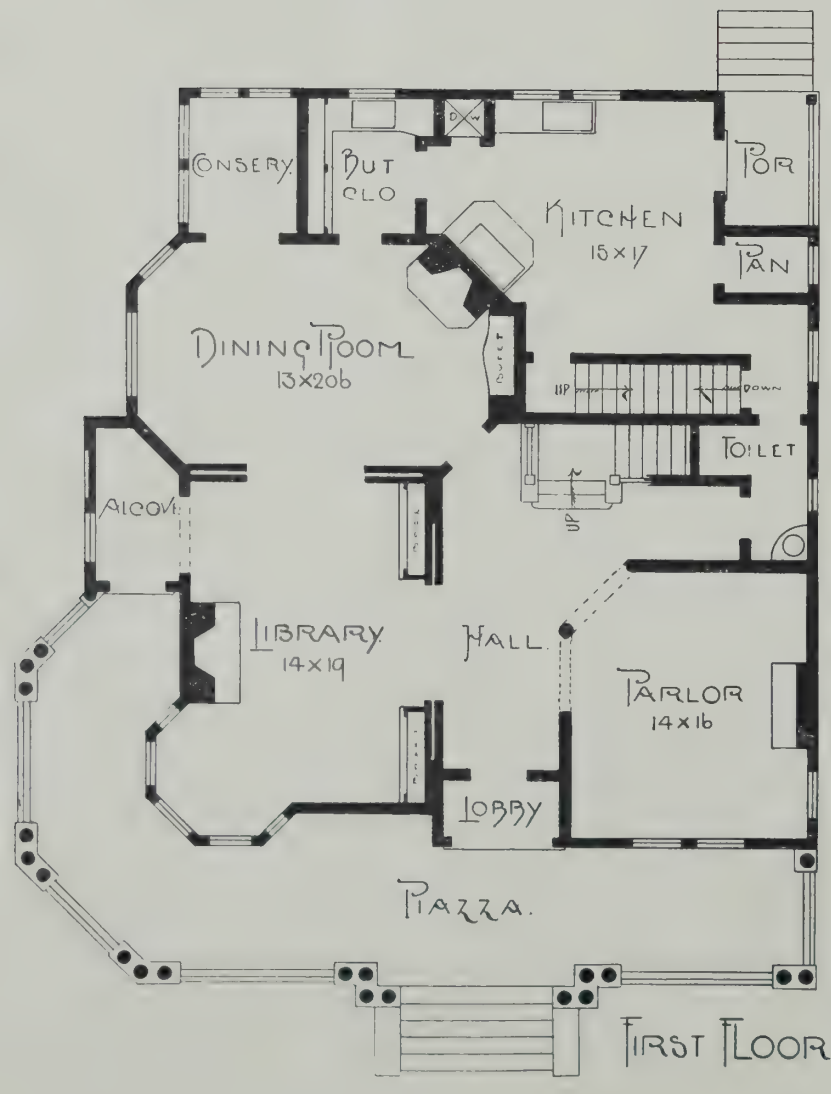
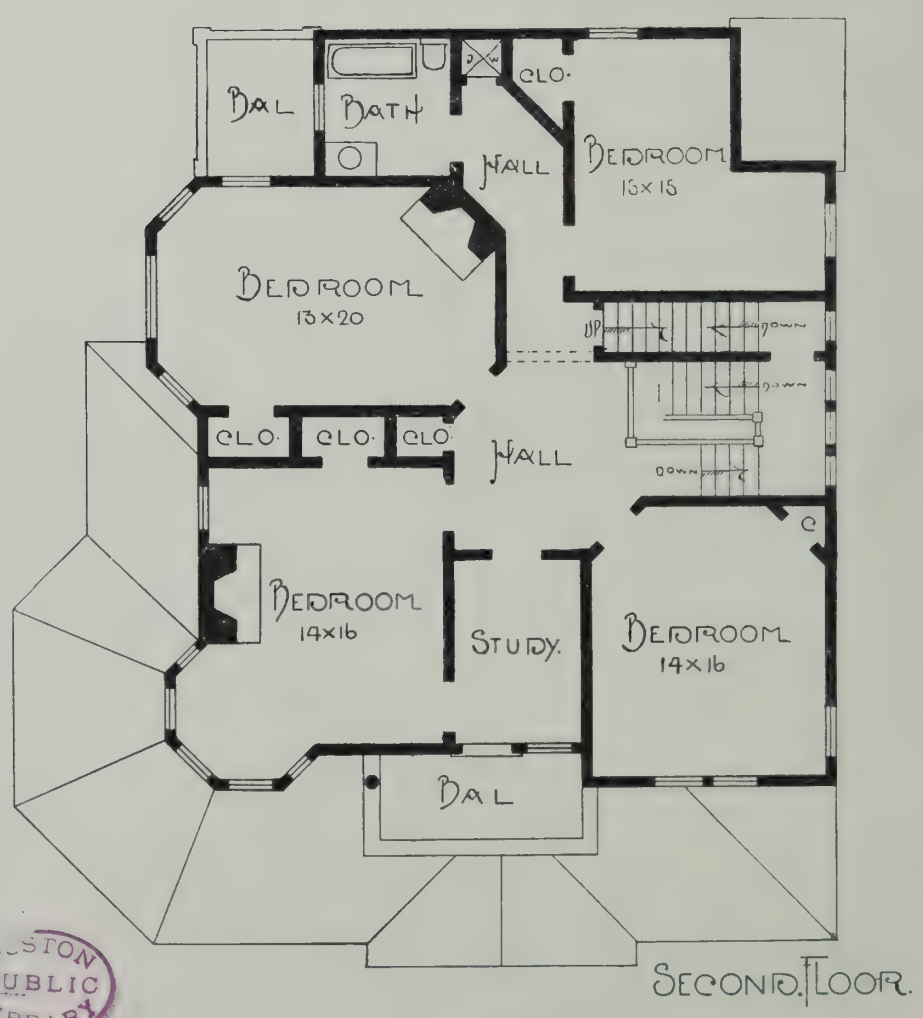
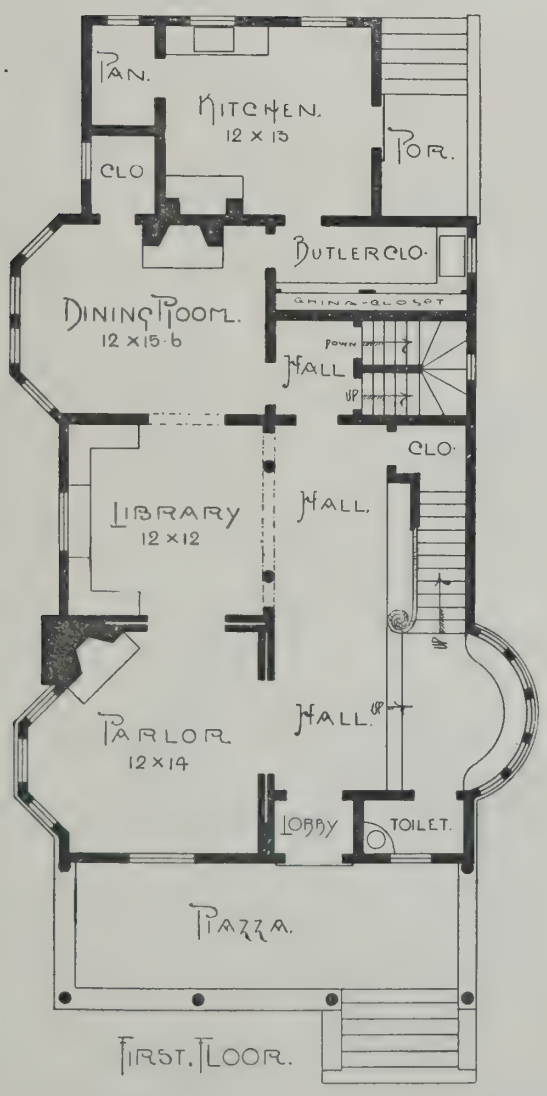




A RESIDENCE AT BENSONHURST, LONG ISLAND.—See page 67.



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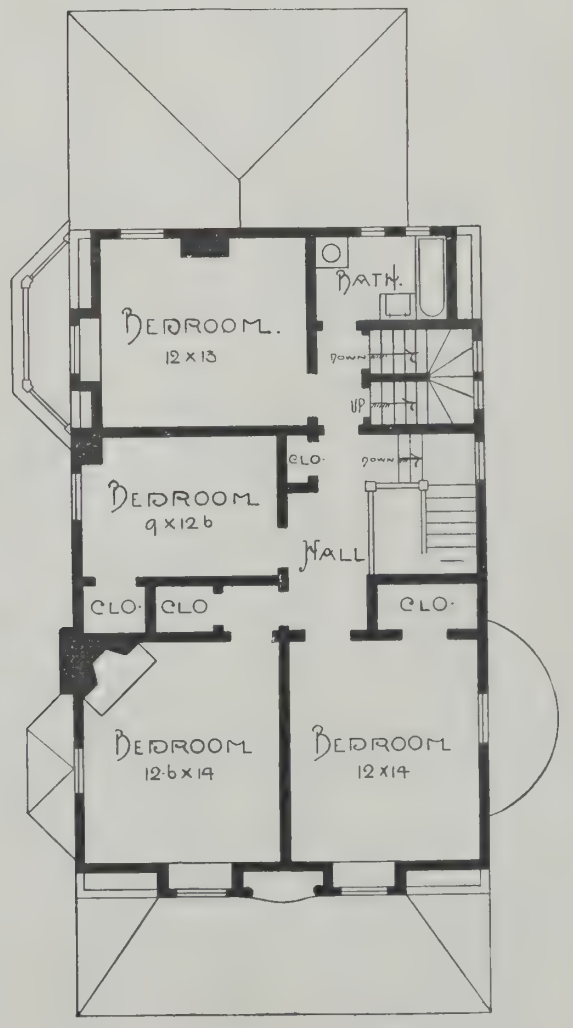

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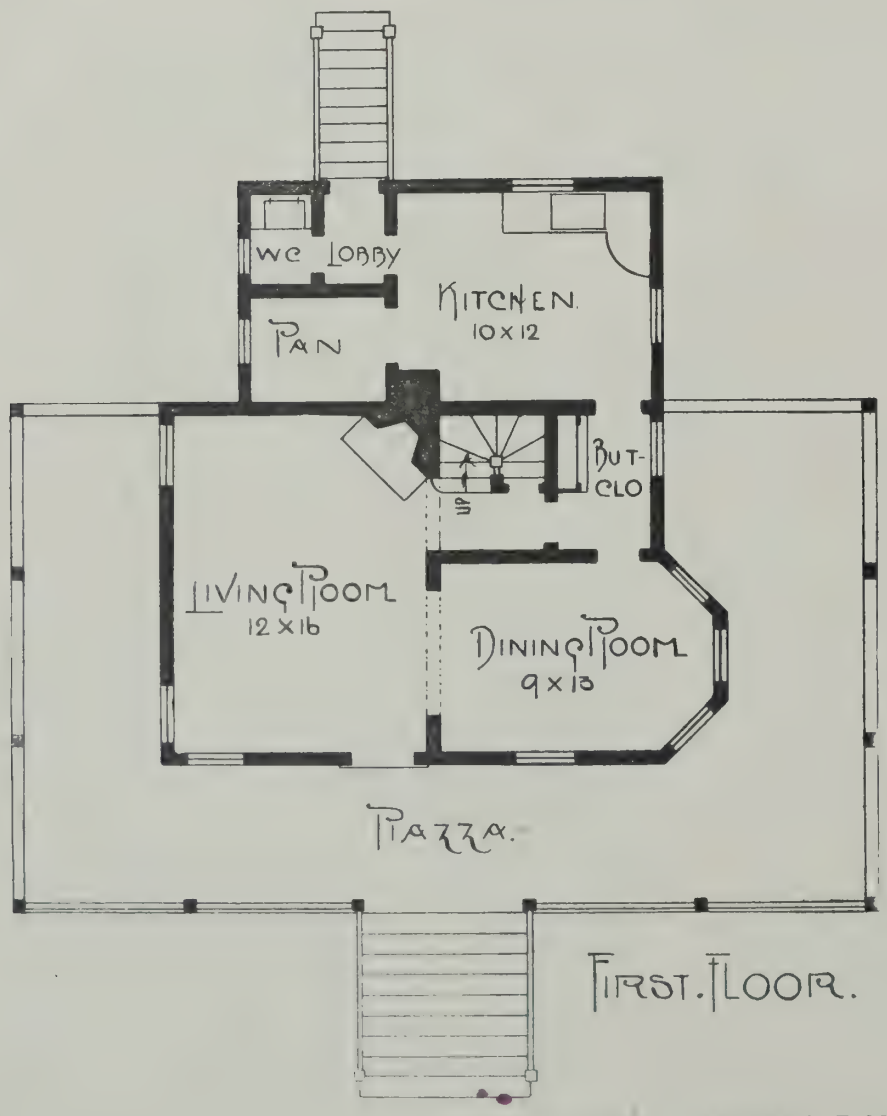
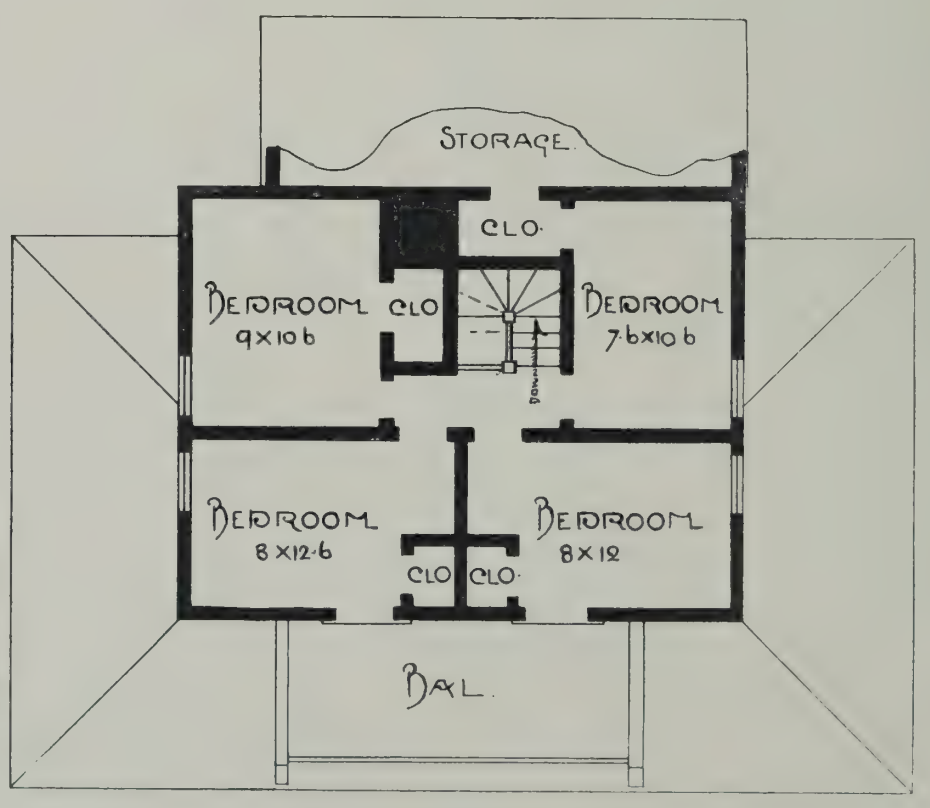
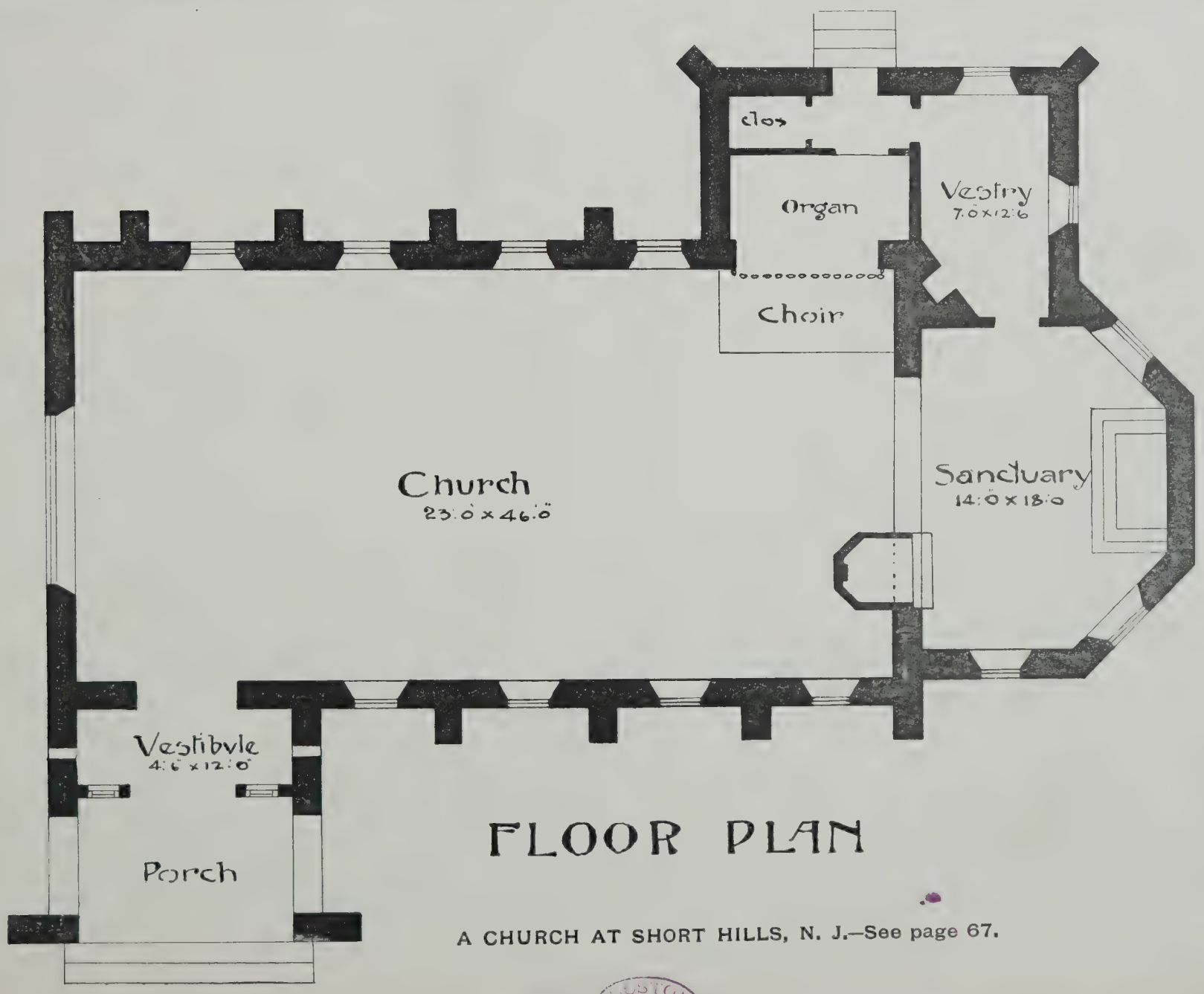
A COTTAGE AT EDGEWATER, ILL.—See page 77.





AN EIGHT HUNDRED DOLLAR COTTAGE.—See page 66.



FLOOR PLAN

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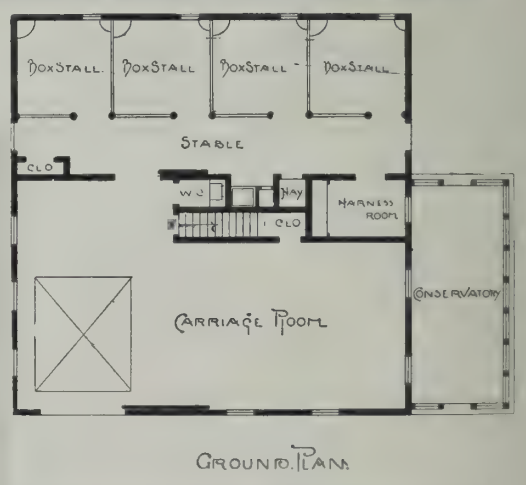
A RESIDENCE AT BENSONHURST, N. Y.—See page 66.



GROUND PLAN.

A STABLE AND CONSERVATORY.—See page 77.

A RESIDENCE AT BENSONHURST, N. Y.—See page 66.

A STABLE AND CONSERVATORY.

We present on page 76 a stable, accompanying "Rose Lawn," one of our colored plates in this issue, which was recently erected for John Cottier, Esq., at Bensonhurst, Long Island. The design is treated in the Colonial style, and to correspond with its architectural surroundings. It has a foundation of stone and brick, and the construction above is built of wood. The exterior framework is sheathed, papered, and clapboarded. It is painted Colonial yellow, with ivory-white trimmings. The roof is shingled and left to finish natural. Dimensions: Front, 42 ft.; side, 42 ft., not including conservatory. The plan is unique and conveniently fitted up. The carriage room is well lighted and ventilated. It has a floor concreted, and is provided with carriage wash. The stable contains four box stalls, furnished with the usual ornamental iron fixtures, hay and feed chute, harness room, closet and sink. Stairs lead to second floor, containing two bedrooms and ample storage. The walls and ceiling throughout are ceiled with narrow beaded stuff, yellow pine, and finished natural. Messrs. Parfitt Bros., architects, 26 Court Street, Brooklyn, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT ARDMORE, PA.

On page 69 we illustrate the residence of J. H. Pine, Esq., at Ardmore, Pa. The design has a Queen Anne feeling, although some Colonial detail has been used. The arched ombra in the front gable, balcony on rounded bay, and pointed tower, as well as dormer windows, make a pleasing and rather original effect. The shingle-work throughout is very good, both round and square butts having been used. The piazza is very large and well shaded, the roof being supported by Tuscan columns, which at the corners are set on stone piers slightly higher than the goose neck of the rail. There is a four foot entrance door to the hall, which has an open fireplace and arched opening to parlor. This room is well lighted by bay and mullioned windows, connects by broad arched opening with library, the features of which are its rounded bay and angle fireplace. Sliding doors lead to dining-room, with an eight foot mullioned window and angle china closets with glass doors, giving the single window effect of bay. Kitchen is well fitted up with range, sink, dresser, etc., and has a large pantry. There are a laundry extension and porch in the rear. This entire floor, with exception of kitchen and laundry, is finished in oak; the latter in white pine, natural finish. Second floor is in white pine, finished natural; contains one very large and three very good sized bedrooms, provided with wardrobe or closet room and bath. The plumbing and all other work throughout the house is of the best. Attic contains three rooms. Dimensions: Front, 30 ft. 2 in.; side, 58 ft. over all. Heights: Cellar, 7 ft. 4 in.; first story, 10 ft.; second story, 9 ft. 4 in.; attic, 9 ft. The foundation and first story are of rock-faced local stone. Second and third story shingled over sheathing and rosin sized paper. Roof is of gray slate. Shingles, etc., painted light yellow, with trimmings in chrome. Cost of house complete, $6,750. Architects and builders were Messrs. J. B. Cornell & Sons, Philadelphia, Pa.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT EDGEWATER, ILL.

We publish on page 73 a cottage erected for Edgar Smith, Esq., at Edgewater, Ill. The whole treatment of the design is in the Colonial style, very unique, with attractive elevations, bits of pleasing detail, and well arranged floor plans. The underpinning, balustrade to piazza, and chimney, which is a feature in itself, are built of "rock-faced" stone of a reddish gray color, laid up at random in red mortar. The first story is clapboarded and painted Colonial yellow, while the second and third stories are shingled and stained moss green. Roof shingled and stained similar. Dimensions: Front, 33 ft.; side, 53 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The main hall is one of the most complete features. It is trimmed with antique oak, and is provided with a paneled divan and an ornamental staircase, with spindle balusters, and a newel post formed with a cluster of same. An oriel bay window is thrown out at first landing, and is finished with a cluster of small windows and a paneled seat. Oak floor. Vestibule has a tiled floor and a paneled wainscoting. Toilet is conveniently located. Parlor is trimmed with pine and finished with China white. It contains an open fireplace, built of brick, with tiled trimmings, and a mantel of Colonial style, with columns and mirror. Library is trimmed with oak, and is separated from hall by carved columns, extending to ceiling, and forming an arcaded effect. It has bookcases and window seat built in. Dining-room is trimmed with birch, and provided with a large china closet and fireplace, with tiled trimmings and mantel. Kitchen and pantries are trimmed with whitewood, finished natural, and are furnished with the usual fixtures complete. Second floor is trimmed with pine, finished natural. It contains five bedrooms, with large closets, hardwood floors and bathroom. Bathroom is wainscoted, and provided with the usual fixtures and exposed plumbing. Three bedrooms on third floor. Cemented cellar contains furnace, laundry and other necessary apartments. Cost $7,800 complete. Mr. G. W. Maher, architect, 218 La Salle Street, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

Wood Pavement in London.

The new Tower Bridge is paved with the wood of the eucalyptus tree, from Australia. The blocks are about the size of building bricks, and their top surface has beveled edges, thus affording horses a foothold. They are fastened together by means of pegs put through them, and fitted into corresponding holes in the adjoining blocks. This wood is a dark mahogany color, is very expensive, but heavy and durable. It was laid according to the Duffy patent system, with special machinery, by J. Temperley & Co., of London. Wood is replacing stone pavement in many of the London streets, but in them it is laid in a simpler and less costly manner.

Preservation of Wood.

The wood is impregnated through its pores, under any well-known process, first with a strong solution of calcium bisulphite, and then with a corresponding solution of caustic lime. A monosulphite is formed, which is by the action of the air subsequently oxidized to calcium sulphate, and becomes practically part of the ligneous structure.—A. A. HELY, Westminster, Eng.

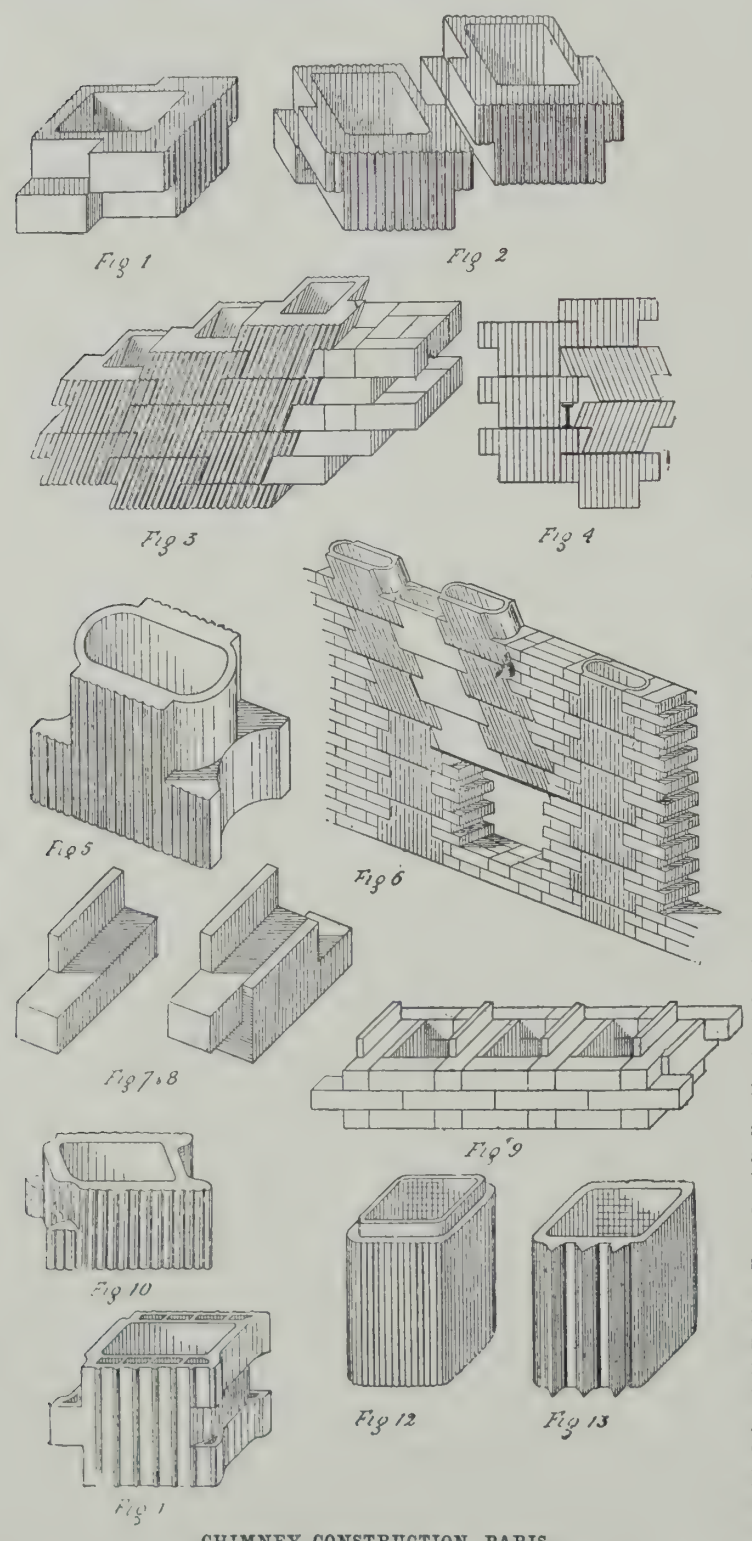
A COTTAGE AT BATH BEACH, N. Y.

The engravings presented on page 70 illustrate a cottage recently erected for G. W. Snook, Esq., at Bath Beach, Long Island. The design is treated in good style, and it has attractive elevations and well arranged plans, furnished complete. The underpinning is built of brick, laid up in red mortar. The exterior framework is sheathed, papered, and then covered with clapboards and shingles. It is painted Colonial yellow, with bottle-green trimmings. The roof is shingled also, and painted red. Dimensions: Front, 32 ft.; side, 41 ft., not including piazza. Height of ceilings; Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with whitewood. Hall, spacious, is finished in oak. It contains an ornamental staircase, with spindle newels. The fireplace is furnished with tiled hearth and facings and a hardwood mantel. The parlor is finished in cherry, and it contains a similar fireplace, and an octagonal projection rising up into a tower. Dining-room is also finished in cherry, and provided with an open fireplace. Kitchen, laundry and pantries are wainscoted with narrow beaded stuff, and furnished with the usual fixtures complete. The second floor is finished in ash. It contains three bedrooms, large closets and bathroom, the latter being wainscoted and fitted up replete. Three bedrooms and storage on third floor. Cemented cellar contains laundry, furnace, and other apartments. Mr. Percey Emmett, architect, Bath Beach, Long Island.

Our engravings were made direct from photographs of the building, taken specially for the Scientific American.

METHODS OF CONSTRUCTING CHIMNEY FLUES AND PIPES AT PARIS.

The use of earthenware pipes for the building up of chimney flues is now universal at Paris and in the larger French towns. Rarely, except in the case of party walls or in the case of small houses, are the flues built of brickwork. The pipes are constructed to permit much more rapid work, the flues are clean and thoroughly sound, and pargeting is unnecessary. Again, in the case of a flaw it is generally an easy matter to replace the broken portion of piping. The chimney breast is not employed, and there is, therefore, no necessity for foundations for the latter.



CHIMNEY CONSTRUCTION, PARIS.

There is a number of different systems of piping, each one claiming perfection and having its partisans. It will, therefore, be interesting to remark a few of those most generally employed at Paris, as shown in Figs. 1, 5, 10, and 11.

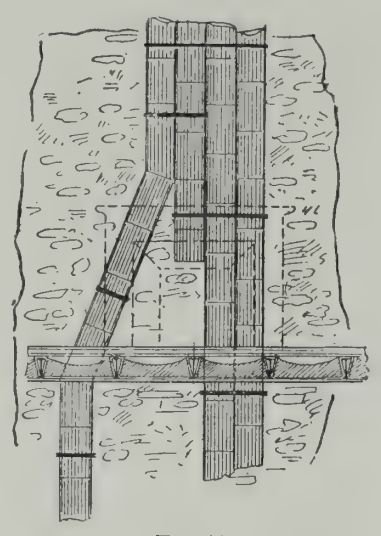


Fig. 14.

All of these are roughly fluted on the two outer surfaces, in order to firmly hold the proper thickness of plastering. The interiors are purposely left rough, to afford a proper hold for the soot, and in the case of the rectangular pipes the corners are slightly rounded.

Some years ago it was the custom generally at Paris, on the construction of a new building, to form the necessary flues in the thickness of the party wall, the first owner of the wall building at the same time as his own flues a similar number of flues for the use of the building which would eventually be built against the party wall. This manner of building flues in the thickness of the party wall was soon, however, forbidden by the building regulations; but after a certain time the prohibition was withdrawn, and it was left to the party owners to construct the joint wall as they might agree upon. The insurance companies, however, then decided that they would take no responsibilities for houses of which the party wall was thus built, for it was evident that a wall pierced in a large portion with chimney flues was not sufficient protection against fire, and did not form a sufficient division between two properties.

This being the case, although the construction of flues in party walls is not forbidden, and is in some cases found necessary, it is now the custom to build the chimney flues against the surface of the wall by means of the hanging pipes shown in Figs. 12, 13 and 14.

The "wagons," or pipes for building into walls, are made of dimensions suitable for walls of the thickness of one brick to two and a half bricks. The walls of the Paris houses are generally built of a thickness to allow a 14 in. by 9 in. flue; in the case of other walls the hanging pipes are generally employed.

Fig. 1 is a system of pipe made by the Vaugirard Brick Co., and presents many advantages over some of the other systems. The flue is rectangular, with rounded angles; the exterior is provided with projections the size and shape of an ordinary brick. These projections are so arranged as to allow one pipe to fit against the other, as shown in Fig. 2. The joints, as will be seen by Fig. 3, representing the grouping of three inclined flues, are broken horizontally and vertically. These pipes in all systems are made for inclination at various angles; the angle may not, however, be more than 30° from the vertical. The system as shown in Fig. 3 has many merits; the putting together is very simple; the pipes are well bedded together; the joints being well broken, there is little danger of leakage. Again, the rectangular projections allow proper bonding with the brickwork of the wall. In the case that any of the iron joists of the floor require support on the portion of the wall pierced by the chimney flue, by employing two inclined pipes, Fig. 4, sufficient room is obtained for the passing of the joists, and a firm bedding is obtained on the projecting edge.

Another system (Fig. 5) is the "wagon solidaire Lacote," having a height equal to four bricks. The ends are alternately convex and concave; the pipes are fitted together as shown in Fig. 6, where two flues, one inclined and one vertical, pass up from the floor below, and two others inclined, supported by a bar, take the smoke from the two chimneys on either side of the wall. This system is much employed, but an inconvenience is that of joining the rounded end of the pipe with the square brickwork of the wall.

Another system is that of Fig. 10. The objection that the projecting ties are weak disappears when the pipes are placed together and well jointed.

Fig. 11 shows the system Duprat, of the height of three bricks. The outer walls are hollow, and are supposed to afford greater protection and solidity. In these last two examples the horizontal joints are not broken.

The system of chimney bricks Lacote is also much employed. This brick (shown in Fig. 7) is of the height of two bricks, the upper vertical projection forming the thickness of a brick. The length of this brick is of the thickness of the wall, less one half brick. When two are fitted together, as in Fig. 8, they form the thickness of the wall, the extremity of each resting on the wall, the remaining portion on the lower one. This special brick forms a secure joint, and has the advantage of making a neat jointing in cases where the wall is left unplastered.

Hanging pipes, or pipes fixed to the wall, are much employed, and are most useful and convenient, either in the case when the available portion of the wall is already filled with flues or in the case of thin partition walls, or, if necessity is found, to add one or two flues to those already existing. The regulations allow these pipes to be fixed to walls of not less than one brick thick; for the topmost story, however, they may be fixed against partitions of a ½ in. thickness. The ordinary form known as the "Boisseau Gourlier" is that of Fig. 12, of the height of six bricks, with rough surface for plastering and ribbed end. That of Fig. 13 is known as the "Lacote," and has on the side toward the inside of the wall three angular projections, called witnesses, intended to oblige the plasterer to cover with the regulation thickness of plaster. This regulation thickness is a little over 3 in., including the thickness of the pipe. These pipes are fixed against the wall with plaster, as in Fig. 14, showing three flues from the lower floors, and one to take the smoke from the chimney of that floor.

The pipes are further firmly fixed to the wall by means of iron straps, placed about every 5 ft., and the whole is properly covered with the regulation thickness of plaster. These pipes are most convenient, for they can be inclined in any direction to avoid doors or windows; they are very light and economize space. Most of these systems are patented in France and abroad, and form a source of large profits to brickmakers. The wall pipes cost from £3 to £4 10s. per hundred, and the hanging pipes from £2 to £3 10s. per hundred, less trade discount. There is, therefore, a great economy in employing them, both as regards cost and labor.—Arthur Vye Parminter, in *The Building News*.

The Passing of Red Brick.

In no department of human industry, says the *Washington Post*, has there been greater evolution of late years than in the business of making bricks. Formerly we had nothing but old-fashioned red brick that reached the climax of perfection at Philadelphia, and was shipped thence at great expense all over the country where a high grade article was in demand. But the red brick has had its day for architectural use, and in its place has come to stay the brick of lighter hue—pink, buff, yellow, and, in fact, of nearly every shade.

A brick can be made that is as mottled as a sea gull's egg, or one that will show the varying tints of an autumn leaf. It is done by adding certain metallic ingredients to the clay after the latter has been ground to the finest powder. It is the iron in the clay that gives the ordinary brick its deep red. In future most of our city residences are going to be constructed from brick of these pleasing colors. They give relief to the eye and variety. What can be more monstrous than a row of red brick houses? Washington is taking to the new style, and in this clear atmosphere, unspoiled by the soot from soft coal combustion, a house of this beautiful material will stand fresh for a century, and be solid years after one made of granite had disintegrated.

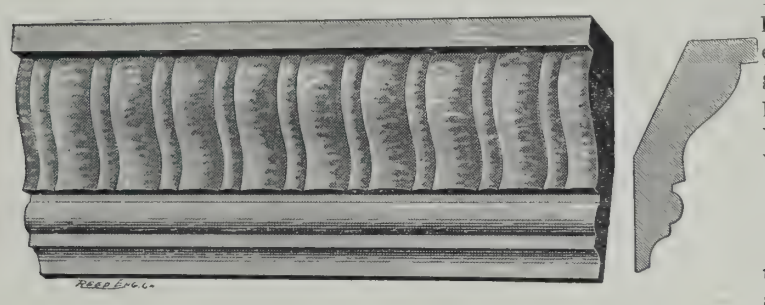
Long Distance House Moving.

A curious case of house moving was recently witnessed in Oregon. A man who owned a residence at Seattle, which cost him $5,000 to erect, removed to Olympia, and did not have sufficient funds to build another house. He bought a lot, and concluded to remove the building he owned at Seattle. Every one laughed at him, but he persisted. Rolling the house down to the river, he loaded it upon a scow, and it was soon at Olympia, a distance of about sixty miles. Then he had it rolled upon his lot, and, strange to say, not a timber was strained nor even a piece of furniture was broken, although he had not removed the contents before starting the house upon its unusual journey.

CARVED AND FANCY MOULDINGS.

The illustrations represent two out of a large number of recent styles of carved mouldings made by the American Carving and Mfg. Co., of No. 3 West Bridge St., Grand Rapids, Mich. These mouldings are carved smooth in a great variety of woods, the work being greatly superior to embossed finish, and the company make a specialty of carving original and special designs. The business has grown rapidly, a three-story factory, with large drying kilns, having been lately purchased to afford additional room for its development. Fully one-third of the output is now sold for export, and a number of government buildings are being supplied with these mouldings.

CARVED AND FANCY MOULDING.



CARVED AND FANCY MOULDING.

A New Sash Lock.

The Gardner Sash Balance Co. are just introducing a new sash lock which is a new departure in that line. It consists in having the latch and keeper stamped from cold rolled steel, thus making the two essential parts absolutely indestructible, the working parts of the lock being so constructed that there can be no wear out to it. The lock is neat, compact, and strong. There are no delicate parts to get out of order, there being but three pieces in its construction—the handle, latch, and base-plate. The lock is manufactured in all the styles and finishes of general hardware. Descriptive price list will be sent by addressing the Gardner Sash Balance Co., Chicago.

AUTOMATIC HEAT REGULATION IN HOUSES, ETC.

The Electric Heat Regulator Co., of 26th St. and B Ave., South, Minneapolis, Minn., issue a most satisfactory pamphlet descriptive of their automatic regulators for use on furnaces, steam or hot water heaters, and wherever the automatic regulation of temperature is desired. The illustration represents a thermostat of this system, which, when set up, is carefully adjusted with a thermometer, and which acts to change the dampers of a furnace whenever the temperature of the room rises above or falls below the degree for which the instrument is set. It saves the labor of servants, obviates the inconvenience and annoyances of their carelessness and inattention, and economizes fuel. This regulator works day and night, from autumn until spring, to keep the temperature of the house uniform, at whatever degree may be desired. All interested should send to the company for a catalogue.

THE officials of Canyon County, Idaho, have just purchased a complete outfit of steel jail cells for the county jail at Caldwell from E. T. Barnum, of Detroit, Mich., the well known and reliable manufacturer of wire and iron work. Mr. Barnum issues, in addition to a catalogue of jail work, special illustrated catalogues of various other lines of goods which he manufactures, prominent among which may be mentioned the following: Wire and iron fencing, bank and office railings, wire cloth, roof crestings, stable fixtures, weather vanes, reservoir vases, iron chairs, settees, etc., which he will gladly send to any one on application.

Woodwork vs. Flame.

In a London paper is published a letter from Mr. F. H. Gossage, who makes some interesting statements. He says:

"I find that painting woodwork of any kind with several coats of solution of silicate of soda, and finishing with a mixture of this solution and sufficient common whiting to make it about as thick as ordinary paint, is an excellent protection against fire. Wood treated in this way will not take fire from mere contact with flame; it requires to be heated till destructive distillation begins. Then, of course, gases are given out which ignite, and the wood is gradually converted into charcoal, but until destructive distillation takes place the coated wood will not support combustion. A few years since I had some screens made like ordinary doors, some prepared as I have described, and some not. They were then placed over a fire of shavings, which was kept constantly renewed. In ten minutes the unprepared screens were blazing away, and so nearly consumed that they had to be supported by an iron bar. The flames continued to lick the prepared screens for thirty minutes before the distillation commenced. After forty-five minutes the coated screens were still intact and able to support themselves; they held together for an hour, although pierced in many places with holes, and when the fire was removed they did not continue to burn. This was a splendid success, and I still have the remains of the screens. The experiments were made at my suggestion for the managers of the Liverpool Philharmonic Society, and the woodwork of their splendid hall at Liverpool was treated in this manner."

Curiosities about Wood.

The strongest wood which grows within the limits of the United States is that known as "nutmeg" hickory, which flourishes on the Lower Arkansas River. The most elastic is tamarack, the black, or shellbark, standing not far below. The wood with the least elasticity and lowest specific gravity is the Ficus aurea. The wood of the highest specific gravity is the blue wood of Texas and Mexico. The heaviest of the foreign woods are the pomegranate and the lignum vitæ; the lightest, cork. The tensile strength of the best-known woods is set forth in the following, the words "tensile strength" meaning the weight of power required to tear asunder one square inch of each: Ash, 14,000 pounds; beach, 11,500; cedar, 11,400; chestnut, 10,500; cypress, 6,000; elm, 13,400; fir, 12,000; lance, 23,000; lignum vitæ, 11,800; locust, 20,500; mahogany, 21,000; maple, 10,500; American white oak, 11,500; pear, 9,800; pitch pine, 12,000; larch, 9,500; poplar, 7,000; spruce, 10,290; teak, 14,000; walnut, 7,800; willow, 13,000.

The weight in pounds per square foot (without fractions) of the well-known woods (dry) is as follows: Butternut, 25; cedar, 35; cherry, 45; chestnut, 38; cork, 15; dogwood, 47; ebony, 83; box elder, 43; elm, 41; blue gum, 52; water gum, 62; white hickory, 49; shellbark hickory, 43; holly, 47; juniper, 35; lancewood, 45; larch, 34; basswood or lime, 73; mahogany, 66; hard maple, 46; white maple, 34; mulberry, 35; white oak, 53; persimmons, 44; pear, 41; pitch pine, 41; red pine, 36; white pine, 34; yellow pine, 33; plum 49; poplar, 33; quince, 44; rosewood, 45; sassafras, 30; spruce, 31; sycamore, 38; tamarack, 23; black walnut, 14; white walnut, 32; the willows from 30 to 26, and the yew, 49.

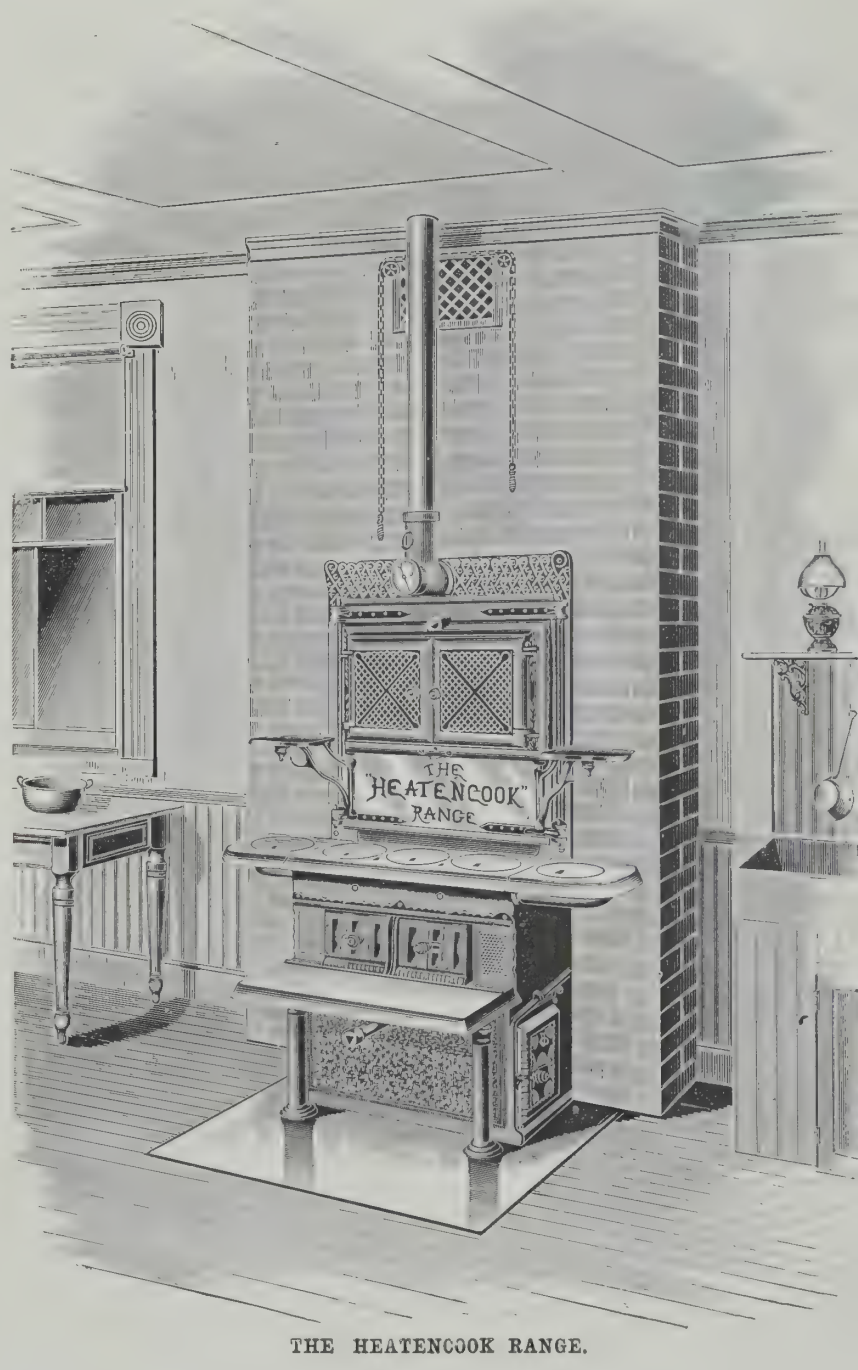
Four hundred and thirteen different species of trees grow in the various States and Territories, and of this number, sixteen, when perfectly seasoned, will sink in water. These woods of high specific gravity grow mostly in the arid regions of New Mexico, Arizona, and Nevada.

Cement Water Tanks.

In the *Chemical News*, Dr. T. L. Phipson gives an account of an extraordinary sample of water he had received for analysis. A gentleman in the country sent him about four quarts of what he termed "drinking water from a new reservoir." The sample was colorless, bright and clear, had no deposit and no odor; but it had a distinctly bitter taste and an alkaline reaction. It turned red litmus paper blue in an instant. This water, he was informed, was good for nothing. It was impossible to drink it; it cooked vegetables badly, depriving them of their color; and, when used for washing, it attacked the hands. It became milky when a current of carbonic acid was passed into it; and it contained a considerable amount of caustic lime, yielding to analysis exactly 100 grains of lime to the imperial gallon; but in other respects it was not rich in saline or organic matter. Having followed up the subject, Dr. Phipson learned that no water was supplied to the house, and there was no well. The rain water which fell upon the roof was collected, and conducted by an iron pipe into a subterranean reservoir supplied with a pump. This reservoir had been lined with hydraulic cement, which was probably of bad quality, and yielded up caustic lime, sulphate of lime, and other salts in smaller amounts, and of lesser importance to the water. Dr. Phipson thinks the results point to the importance of such cements being submitted to very careful chemical examination before being used for reservoirs destined for the storage of water for domestic purposes.

AN IMPROVED RANGE AND HOT WATER HEATER.

The illustration represents a combined kitchen range and hot water heater, designed to utilize the heat ordinarily wasted in the kitchen. It is the invention of Mr. A. P. Broomell, of the firm of Broomell, Schmidt & Co., Limited, of York, Pa., by whom only this apparatus is manufactured. The ashpit is large, handy to be got at, and easily cleaned from either side. Provision is made for enlarging and constructing the grate surface, better fitting the range for winter and summer use, and either piece of grate may be taken out through the top. The oven will bake or roast with a very small fire, and can be controlled to bake properly with the firebox full size and a hot fire, the temperature being controlled by a damper in the heat passage. The "Heatencook" range and heater not only does the cooking and heating, but it also furnishes an ample supply of warm or hot water for the bath, laundry, and kitchen sink. This supply of warm water is available summer and winter, and in almost any quantity. When the system is connected with a street water supply, the warm water drawn from the apparatus is immediately replaced by the street pressure. If a supply tank in top of building is used, the amount of warm water is only limited by the capacity of the tank.



THE HEATENCOOK RANGE.

How to Cool a Cellar.

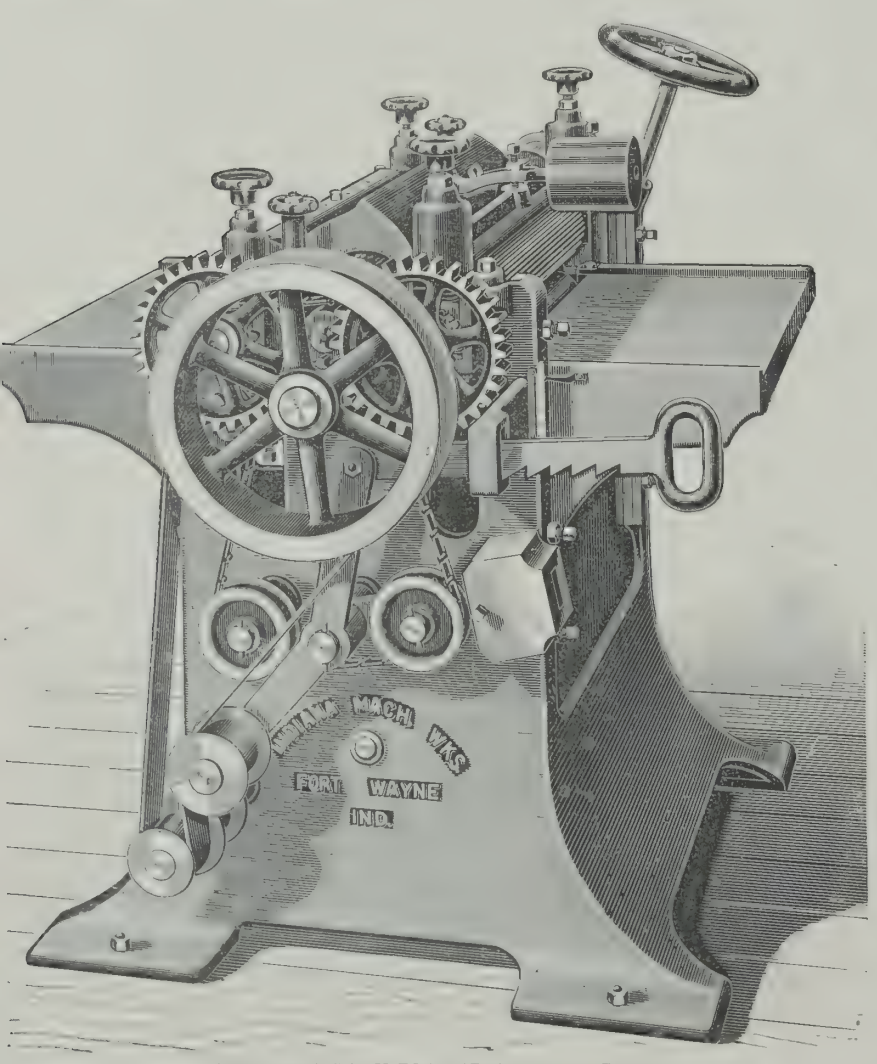
A great mistake is sometimes made in ventilating cellars and milk houses. The object of ventilation is to keep the cellars cool and dry; but this object often fails of being accomplished by a common mistake, and instead the cellar is made both warm and damp. A cool place should never be ventilated, unless the air admitted is cooler than the air within, or is at least as cool as that, or a very little warmer. The warmer the air, the more moisture it holds in suspension. Necessarily, the cooler the air the more this moisture is condensed and precipitated. When a cool cellar is aired on a warm day, the entering air, being in motion, appears cool, but as it fills the cellar, the cooler air with which it becomes mixed chills it, the moisture is condensed, and dew is deposited on the cold walls, and may often be seen running down them in streams. Then the cellar is damp and soon becomes mouldy. To avoid this the windows should only be opened at night, and late—the last thing before retiring. There is no need to fear that the night air is unhealthful—it is as pure as the air of midday, and is really drier. The cool air enters the apartment during the night and circulates through it. The windows should be closed before sunrise in the morning, and kept closed and shaded through the day. If the air of the cellar is damp, it may be thoroughly dried by placing in it a peck of fresh lime in an open box; and, the *National Builder* adds, a peck of lime will absorb about seven pounds, or more than three quarts, of water; and in this way a cellar or milk house may soon be dried, even in the hottest weather.

A NEW WOODWORKING MACHINE.

The pony planer and smoother shown in the illustration is heavier and stiffer than most others of its class on the market, has a positive feeding mechanism, and quick and convenient adjustments of all its separate parts.

The frame is cast in one piece, has wide floor bearing, and is very rigid. The bed is fitted into the frame between heavy guides, provided with steel gibs and adjusting screws at front end of frame, and is raised and lowered for different thicknesses of lumber by means of the large handwheel, convenient to the operator. The platen immediately under the cylinder is extra heavy and independent of the bed proper; in case of wear it can be easily removed and trued up at little expense and labor.

The feed consists of four large feed rolls, 3½ inches in diameter, all of which are driven, making a positive feed which is under the immediate control of the operator, and may be started or stopped instantly by means of the balanced tightener; the feed is derived from the main cylinder, and is always governed by the speed thereof; when it lags in speed, the feed lags correspondingly. The gears are all cut from solid iron.



IMPROVED PONY PLANER AND SMOOTHER.

The cylinder is a solid steel forging, has long journals running in bearings lined with genuine babbitt, and provided with an improved self-oiling cap. A pressure bar on both sides of cylinder, coming very close to one another, prevents tearing out in cross-grained or knotty lumber, and renders it possible to do the finest smoothing; both pressure bars are adjustable while the machine is in motion. An 18 inch machine weighs 1,600 pounds, and a 24-inch machine weighs 1,800 pounds. The manufacturers are the Indiana Machine Works, Fort Wayne, Indiana.

IMPROVED STAGE BRACKET IRON.

This is an iron intended for use on wall stage brackets, and can be applied to ordinary brackets in place of the old-fashioned threadbolt, using the same hole. The iron can be put up and fastened entirely from the outside by one man. Each iron is warranted to hold 400 pounds. To apply the iron: First remove the old iron, and cut mortise, *a a*, in face side of bracket, 4 in. long by ½ in. wide, just below the arm; then drawbore $\frac{5}{16}$ in. hole at *b*, 1¾ in. below arm and 1⅛ in. from face side of bracket Insert bent iron, *c*, in slot, *a a*, with straps, *d*, on outside, and bolt at *b e*. To attach bracket to building, bore 1 in.

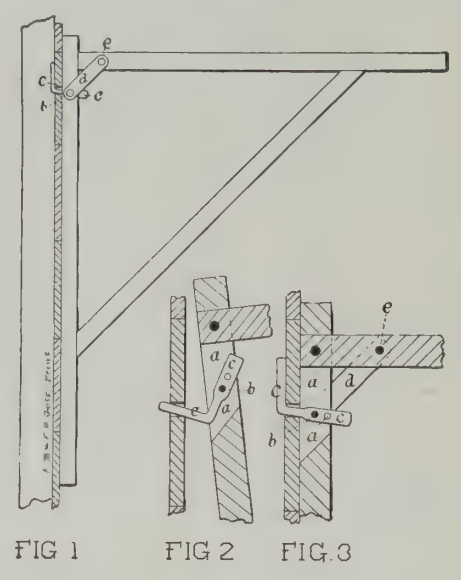


FIG 1 FIG 2 FIG 3

MAKEPEACE'S STAGE BRACKET IRON.

hole through boarding, insert bent iron, and pull down on bracket. To use through shingles, bore two ¾ in. holes (8 thus), as, being thicker than boarding, requires more room for iron to turn. Take notice, there are two holes in flat part of bent iron. Use hole nearest bend for boarding, and the other for shingles. Fig. 2 shows the iron in position ready to be put up. Figs. 1 and 3 show the iron as it stands when attached to buildings.

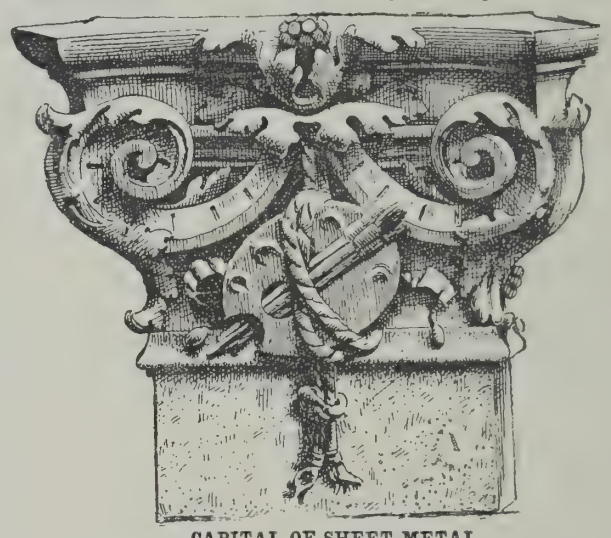
The sole manufacturers of these irons are Messrs. Makepeace Bros., Marston's Mills, Mass.

Party Walls.

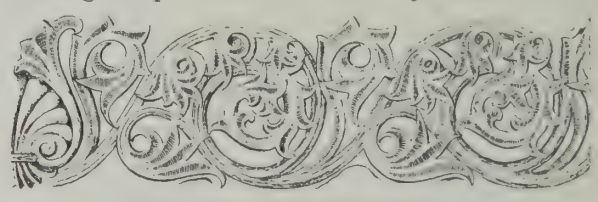
An important decision in regard to party walls was given by the Massachusetts Supreme Court the other day. Many years ago a certain land owner, who may be called A, built two houses on Bedford Street, with a party wall between them, and subsequently sold the houses to different purchasers, without any stipulation as to the use of the party wall. B, who succeeded to the rights of one of the purchasers, strengthened the foundations of the party wall, and added to its height, for his own purposes, paying all the expense of doing so himself. Afterward C, the owner of the adjoining estate, built his house higher, using, for that purpose, the party wall which had already been carried up. The representatives of B demanded of C payment for a part of the cost of the addition which had been made to the party wall, which C had now utilized. C refused to pay anything, and a suit was brought, which has just been decided in favor of the defendant, the court holding that there was no stipulation or agreement in any form, binding the defendant to pay for the use of the wall, and that no such agreement could be implied; and that the defendant was entitled to use without payment, in the way he did, so much of the wall as he found standing on his own land. It may be remarked that there is no general party wall statute in Massachusetts, and no legislation defining the rights of persons who find themselves in possession of a wall built partly on land of another; so that the court probably felt itself obliged to fall back on the common law rule, that every man is the absolute owner of whatever may be built on his land, no matter how it may have come there. Nevertheless, the building of a wall partly on each of two adjoining estates, or even two parts of one estate, indicates that each party receives value from the other, in the form of a saving of expense, and of available land, in return for which he gives the right to place half the wall on his land, and pays half the expense of building it; and it would not be a very violent assumption to consider that the rights and obligations so conceded and incurred attached to the land, so long as the wall built in common was used by both parties. A provision to this effect might with propriety be embodied in future legislation, and would have the advantage not only of preventing the appropriation without payment of other people's labors, but of promoting the construction of party walls, which, particularly in a city of pile foundations, like Boston, represent, where properly arranged, stability of construction, and great saving of expense and of valuable room.—*American Architect.*

ARCHITECTURAL SHEET-METAL ORNAMENTS.

The accompanying illustrations represent some of the work of the Metal Stamping and Spinning Co., of Grand Rapids, Mich., manufacturers of architectural sheet metal ornaments and steel ceilings. They make a specialty of new designs, never before reproduced, in copper or zinc. One of the pictures represents a capital, and another shows a panel scroll, which is made to start from a given point and run both ways from it. The large shell represented provides a figure which may be utilized in odd spaces. This company has just added a battery of three new steam cylinder drop presses to their plant, one new press being for large display pieces, and having a capacity of 40 inches square, while one is for long lengths of enrichments, and one for steel ceilings. They have just issued an 80-page catalogue, showing over 600 new designs in capitals, rosettes, garlands, leaves, mouldings, enrichments, panel scrolls, etc., which will be mailed to applicants therefor.



CAPITAL OF SHEET METAL.

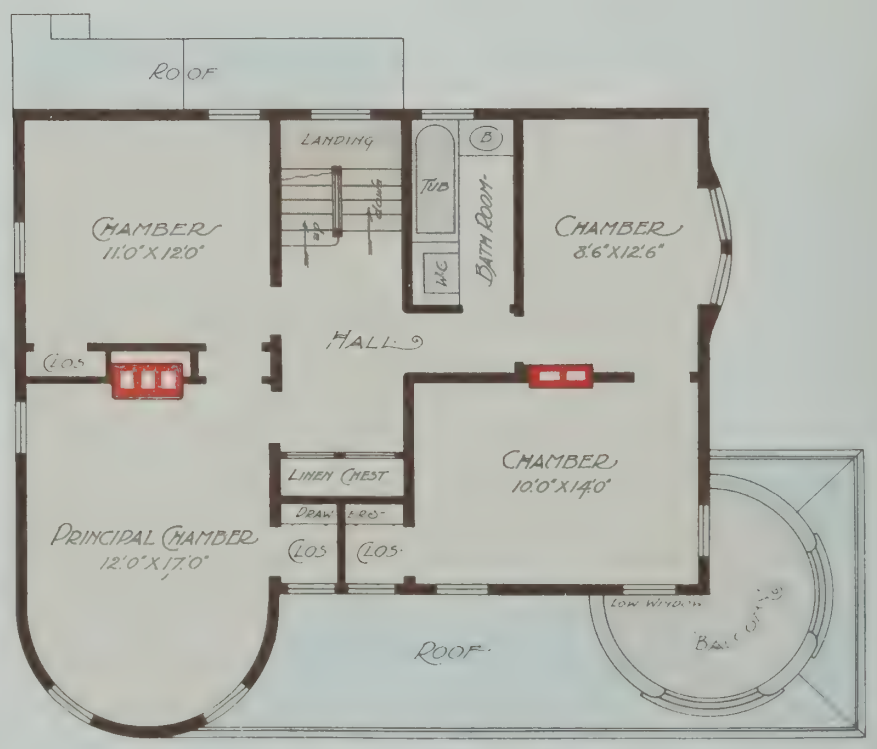


PANEL SCROLL OF SHEET METAL.

SHELL OF SHEET METAL FOR WALL DECORATION.

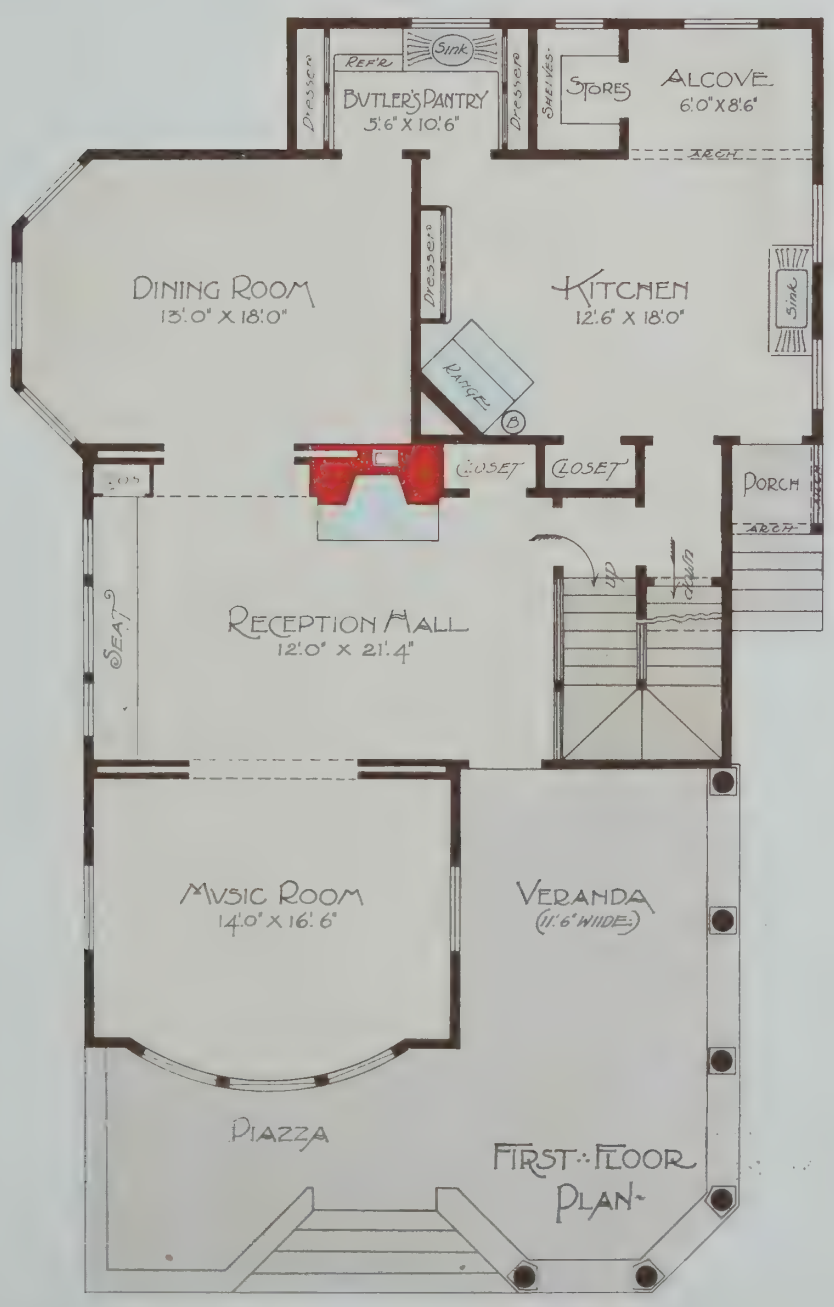
A RESIDENCE AT BRONXWOOD PARK, N.Y.

FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A RESIDENCE AT CHESTERHILL, MT. VERNON, N.Y.



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A RESIDENCE AT CHESTER HILL, MOUNT VERNON, N. Y.—See page 82.

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THE

Scientific American,

ARCHITECTS AND BUILDERS EDITION.

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This is a special Edition of THE SCIENTIFIC AMERICAN, issued monthly. Each number contains about forty large quarto pages, forming, practically, a large and splendid **Magazine of Architecture,** richly adorned with *elegant plates in colors* and with fine engravings; illustrating the most interesting examples of modern Architectural Construction and allied subjects.

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CONTENTS

Of the December number of the ARCHITECTS AND BUILDERS EDITION of SCIENTIFIC AMERICAN

(Illustrated articles are marked with an asterisk.)

A RESIDENCE AT BRONXWOOD PARK, N. Y.

One of our plates in colors this month illustrates the residence of Mr. Alfred Graham, situated at Bronxwood Park, Westchester Co., N. Y. An additional engraving is given on page 83. The views show a picturesque cottage of modern style, with a well shaded veranda, with circular balcony above, effective grouping of windows, and shingling in gables and dormers. Underpinning is of gray local stone, 18 in. thick. First story, with exception of circular bay, clapboarded. All above, including bay and roof, shingled. Colors: Shingles, roof, stained red; side, snuff-brown; clapboards, light brown; trimmings, yellow. Dimensions: Front, 34 ft., exclusive, and side 31 ft 6 in., inclusive, of veranda, but not of extension. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. The interior arrangement is very complete, showing a good sized reception hall, opening into parlor, with its rounded bay, by an 8 ft. arched opening, and into reception and dining rooms, which also connect. Kitchen has all conveniences, plenty of pantry and dresser room, and well separated, although connecting by passages into dining-room. Second floor contains four chambers, linen and other closets, and bathroom. Attic has three rooms finished off. Cellar is cemented, and extends under entire house, excepting veranda and extension; contains furnace and fuel storage. Chimney, of brick. Finish throughout is of white pine, hard oil finish on first floor and principal rooms. Cost complete, $3,500. Chas. N. Hoar, Esq., architect, Y. M. C. A. Building, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT CHESTER HILL, MOUNT VERNON, N. Y.

The subject of one of our color illustrations presented in this issue is the residence of Gustave Dannreuther, Esq., at Chester Hill, Mount Vernon, N. Y. On page 81 we give an additional view of the house. The design is treated in the Colonial style, has a well shaded veranda, and broad piazza. The underpinning is of brick; exterior framework above is covered with sheathing, felt-paper, and shingles, as is also the roof—all left to weather; columns and trimmings painted cream white. Dimensions: Front, 30 ft.; side, 58 ft. 6 in., inclusive of all projections. Heights of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. The principal features of the house are its cheerful reception hall, with fireplace of long buff brick, mantel, and open staircase, with newel and balusters of pleasing design, four of the latter being used to a tread, seat its entire width, wainscoting four feet high, all in oak. The music-room is finished in white enamel, has a circular bay and oblong window, kept well up from the floor, and glazed with leaded glass of special and original design, and soft color effect. The room is kept devoid of draperies, for acoustic effect. Dining-room connects with hall with sliding doors, is finished in cypress, has bay-window, glazed with leaded glass, and connects with large kitchen, complete with all fixtures, through the butler's pantry, which has dressers, sink, and refrigerator built in, under shelf. The second floor plan shows five good-sized chambers, one with dressing-room, fitted with basin, very generous closet accommodations, and bath, with all desirable fixtures, plumbing exposed, and of the best. Hall on this floor and the next is covered with buff cartridge paper, making a pleasing contrast to the finish, all cypress. The third floor contains den, 14 ft. 6 in. x 18 ft. 6 in. in the front or eastern exposure; has seat in dormer window, and ample book-casing; also two servants' and store rooms. Cemented cellar contains heating apparatus, fuel storage, etc. There is but one chimney, which is of brick, capped with stone. Any further information desired of this very interesting cottage may be obtained of the architects, Messrs. Rossiter & Wright, 47 Liberty Street, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT MOUNT VERNON, N. Y.

On page 86 we illustrate a cottage, costing $4,500, designed by Walter F. Stickles, Esq., architect, Fairfax Building, Mount Vernon, N. Y., and built in the same city, for R. W. Turner, Esq. Dimensions: Front, 25 ft. 2 in.; side, 40 ft. 8 in. Height: Cellar, 8 ft; first story, 10 ft; second, 9 ft.; attic, 8 ft.; underpinning of brick; exterior framework above, sheathed, papered, and clapboarded; painted light yellow. Roofs, gables, and dormers, as well as balcony rail, shingled and left to weather. Trimming color, cream white; sash and blinds, dark green; stone, light gray in color at projecting entrance porch. There are a well-shaded veranda, projecting bays, and balcony, with its unique rail effect. Interior arrangement shows a vestibule, reception hall, with wide openings to library and parlor, and staircase, with niche in side wall, finished in selected white ash. Parlor of good size, having bay full width, with tiled chimney breast, and oak mantel, having circular bevele l mirror. Library has sash door to veranda, and sl ding doors to dining-room, with broad bay and fireplace. Butler's pantry, with dresser, sink, etc. Kitchen, range bricked in, sink and boiler. Second floor plan shows three chambers. Servants' and child's rooms, also bath, with all desirable fixtures. Attic has large billiard and bed rooms finished off, but could be divided into four rooms. Finish of house throughout, except where noted, white pine, natural. Cellar, cemented, contains hot-water heater fuel storage, etc.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE IN BROOKLYN, N. Y.

We illustrate on page 87 the handsome residence of W. K. Clarkson, Esq., corner of Ocean Avenue and Tennis Court, Twenty-ninth Ward of Brooklyn, N. Y. Dimensions: Front, 40 ft.; side, 62 ft. 4 in., not including piazza projection. Heights: Cellar, 8 ft. 6 in; first story, 11 ft. 10½ in; second, 10 ft. 6 in.; attic, 9 ft. The views show a well proportioned building, of pleasing design. Underpinning and first story of wash brick, laid with four projecting and single sunken course, the latter being smooth surface. Color, red; stone water table, sills and lintels of red stone, probably Potsdam. Exterior framework above, sheathed, papered, and shingled (stained brown). Roof shingled and left to weather. Trimming color, olive-green. There are a broad, well shaded veranda and side porch, octagonal bay, forming tower feature, and dormers to relieve the roof lines. Papier mâché frieze course. Interior arrangement shows every convenience. Reception hall, octagonal in form, finished in ash; has open fireplace, tiled with mantel and mirror above. Wainscot, 4 ft. high. Fretwork under flat arch to staircase, hall, and parlor. Stairs with ornamental newel and turned balusters, all in ash. Parlor, finished in cherry, has angle fireplace, tiled and mantel; sliding doors, two inches thick, to dining-room, finished in oak, having mullioned window, angle fireplace, china closet, and plaster cornice. Connects with kitchen through butler's pantry, containing dressers and sink. Kitchen complete with all fixtures, including refrigerator. Extension is used for laundry, water-closets, and closets. Second-floor plans show three large chambers, with fireplaces, and two smaller ones; ample closet accommodation and bathroom, with all desirable fixtures; plumbing exposed, and of the best. We also publish attic plan, showing four large and one smaller chamber, all lighted by dormer windows, and large staircase hall. Venetian blinds throughout to match trim. Complete electric arrangement. Cellar, cemented, contains heating apparatus, fuel storage, etc. Chimneys of brick, capped with stone. Cost, $15,000. Messrs. J. C. Cady & Co., architects, New York City. J. C. Sawkins, Esq., Flatbush, L. I., builder.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE OF MODERATE COST.

We illustrate on page 85 a residence of moderate cost, situated at Bronxwood Park, N. Y., and occupied by Rev. M. R. Deming. The view shows a pleasing design, with well shaded piazza, wide porte-cochère, corner tower, and balconies, well worked in, fieldstone being effectively introduced. Dimensions: Front, 27 ft.; side, 30 ft. 6 in., exclusive of projections. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. Underpinning of local stone; exterior framework above sheathed, papered, and clapboarded, except where tin shingled bands are introduced. Roof tin shingled and painted green. Side painted brown; trimming color, dark brown. Entrance door glazed with beveled glass. Hall, with staircase having ornamental newel and turned balusters, is finished in oak, and connects by wide sliding doors with parlor, having large bay and mantel at angle. Dining-room has open fireplace, tiled, and connects by butler's pantry with kitchen, having range, tubs, etc. Second floor contains four chambers and bathroom, with all fixtures. Library or study, above porte-cochère, is at a trifle lower level than rest of this floor. Attic has one room finished off. Cellar, cemented, contains furnace, etc. A. F. Leicht, Esq., architect, 62 Liberty St., New York City.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

GREYSTONE, A RESIDENCE AT BRONXWOOD PARK, N. Y.

We illustrate, on page 84, Greystone, the residence of Wm. D. Love, Esq., at Bronxwood Park, Westchester Co., N. Y. The design is broadly treated, detail being in the Queen Anne style. Dimensions: Front, 25 ft. 2 in.; side, 45 ft. 6 in., exclusive of bay and veranda projections. Heights: Cellar, 7 ft. 6 in.; first story, 9 ft. 2 in.; second story, 8 ft. 8 in.; attic, 7 ft. 8 in.; Underpinning and first story, rock-faced local stone, gray in color, laid with broken joints, and eighteen inches in thickness. Exterior framework above, sheathed, papered, and shingled. Roof also shingled and colored burnt sienna. Side painted buff; trimming color, dark green, tipped with red. The plan shows a convenient arrangement of rooms. Hall has open staircase, ornamental newel with brass candelabrum and turned balusters on straight string, all finished in oak, and is lighted by large window; a five-foot opening, with fretwork above, to parlor, which has bay, tiled fireplace, and mantel. Sliding doors to dining-room, having wide, arched bay, fireplace with mantel, and a closet in opposite angles, and connects by butler's pantry, containing large dresser, with kitchen, complete with all the usual fixtures, closet accommodations, and wash trays. The plaster on this floor is all sand finish, tinted harmoniously, as, terra cotta in hall and pale blue in dining-room. Second floor is divided into five chambers, with ample closet room and bath. Attic has two rooms finished off, as well as storage space. Finish throughout, except where noted, white pine, natural in principal rooms. Cellar, cemented, contains furnace and fuel storage. W. H. Cable, architect, Morris Building, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COLONIAL RESIDENCE AT FLATBUSH, L. I.

On page 87 we illustrate a residence erected on Ocean Avenue, Flatbush, L. I. Dimensions: Front, 38 ft. 4 in. side, 48 ft., figures exclusive of bay and porch projections. Heights: Cellar, 7 ft.; first story, 9 ft. 2 in.; second, 8 ft. 8 in.; attic, 8 ft. Underpinning is of brick; exterior framework above, sheathed, papered, clapboarded, and painted yellow on first story. Bay and second story shingled, and painted yellow. Roof shingled, left to weather; trimming color, white. The views show a pleasing exterior, in the Colonial style. There is a well shaded front porch, with balcony above, supported by four Tuscan columns of good proportion; circular bay arched window as central feature on second floor, dormers, and eyebrow window are its principal features; sashes are divided with wooden muntons. The interior arrangement is most complete and convenient. Entrance door of light oak, paneled, and glazed with beveled glass. Side lights divided effectively. Hall, 7 ft. 6 in. wide, with arch over staircase, having ornamental newel and balusters, all finished in light oak. Six foot sliding doors lead to parlor, which runs full length of house, finished in white, has broad fireplace and Colonial mantel, with two oval mirrors; tiling, cream white. There are four Ionic columns, with flat arches above; ceiling decorated in relief. Sliding doors to library, finished in dark oak, with angle fireplace, and mantel of neat design; tiling, dark green. Dining-room connects by sliding doors, and has tiled fireplace and mantel, of special design. The circular bay is a very pleasant feature; finish, dark oak. Butler's pantry contains sink and dresser. Kitchen has good sized closet. Rossmore range, bricked in, and faced with glazed brick; hood above; cement hearth. Three tubs and sink conveniently located. Servants' staircase to second floor, which is finished in white pine, natural, and contains five chambers, with generous closet accommodations, and bathroom (wainscoted and capped), complete, with usual fixtures, etc., planished tin. Plumbing exposed, and nickelplated. Attic contains large billiard-room, store and bed room finished off. Cellar, cemented, contains furnace and fuel storage. John J. Petit, Esq., No. 189 Remsen Street, Brooklyn, N. Y., is the architect of the house, which cost $7,500.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

House at Pompton, N. J.

This house, illustrated on page 59 and described on page 60 of our October number, was designed by the well-known architect, Mr. Manley N. Cutter, 203 Broadway, New York City. His name should have been mentioned in connection with the description.

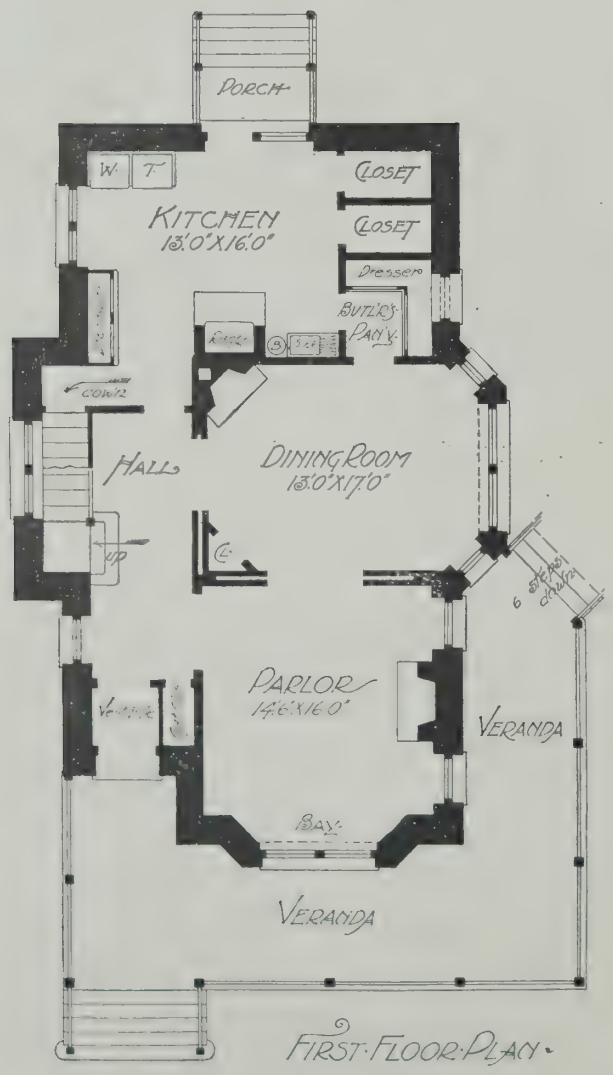
A RESIDENCE AT MOUNT VERNON, N. Y.

On page 88 we illustrate the residence of Edwin H. Wolf, Esq., at Mount Vernon, N. Y. Dimensions: Front, 25 ft.; side, 45 ft. 8 in., exclusive of bay and veranda projections. Heights: Cellar, 7 ft.; first story, 9 ft. 9 in., second, 9 ft. 2 in.; third, 8 ft. 6 in. Underpinning of local stone, laid random rubble. All exterior framework covered with building paper, sheathing, and shingles, left to weather. Blinds and lattice painted dark green. Sash and trimming color, cream white. The views show a pleasing exterior, Colonial in detail, having, as its principal features, corner tower, forming pleasant bay in parlor and main chamber, wash brick chimney, sunken joints, projecting 8 inches beyond face of building, corbeled and capped with stone. Also well shaded veranda and small balcony above. The first floor plan is conveniently arranged, vestibule and coat closet at entrance, reception hall of good size, with double arch to sitting room, and three foot opening for portières to parlor. Both these rooms have angle fireplaces, tiled with mantels above, and connect (as does the dining room) by sliding doors, 4 feet wide and 2 inches thick. Pantry has large dresser with glass doors, lockers, and drawers, also drop table. Sink adjoins store closet, fitted with shelves and pot hooks. Kitchen complete with usual fixtures, including bricked in range, with gas stove attachment and three wash trays. Second floor: main chamber has angle fireplace and arch to dressing room; four other good sized chambers, all with generous closet accommodations, linen closet, large staircase hall and bath-room, with all fixtures of best make, plumbing exposed and nickelplated. Attic has servant's room and bath finished off. Finish: Hall and stairs, quartered oak; rest, whitewood, natural finish; floors double, on 9-inch and 8-inch floor beams. Cellar, cemented, contains servant's water closet, furnace, and full storage bins. Chas. E. Miller, Esq., architect, No. 263 Broadway, New York City. Walter P. Forrester, Mount Vernon, N. Y., builder.

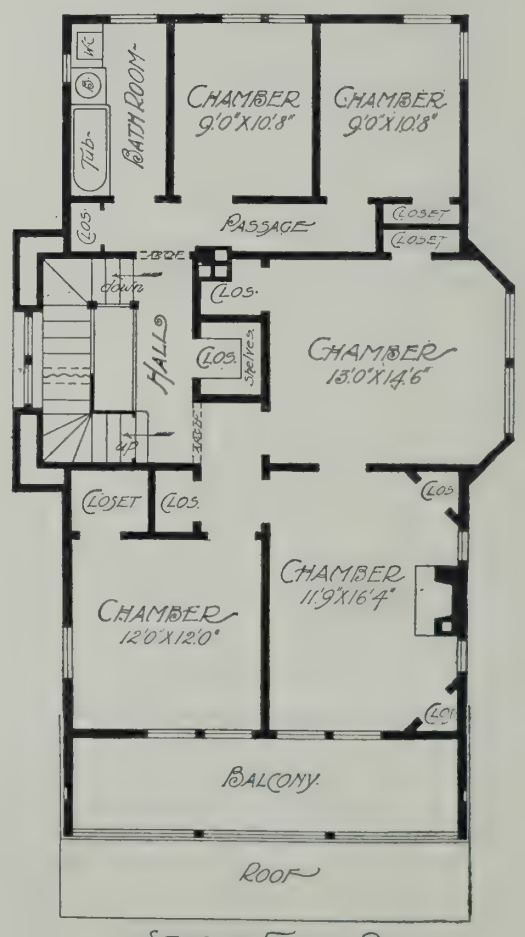
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT BRONXWOOD PARK, N. Y.—See page 82.

MAKING wrought iron pipe direct from bars is the process recently started in a rolling-mill at Stubenville, O. If it works, it means a complete change in pipe manufacture.

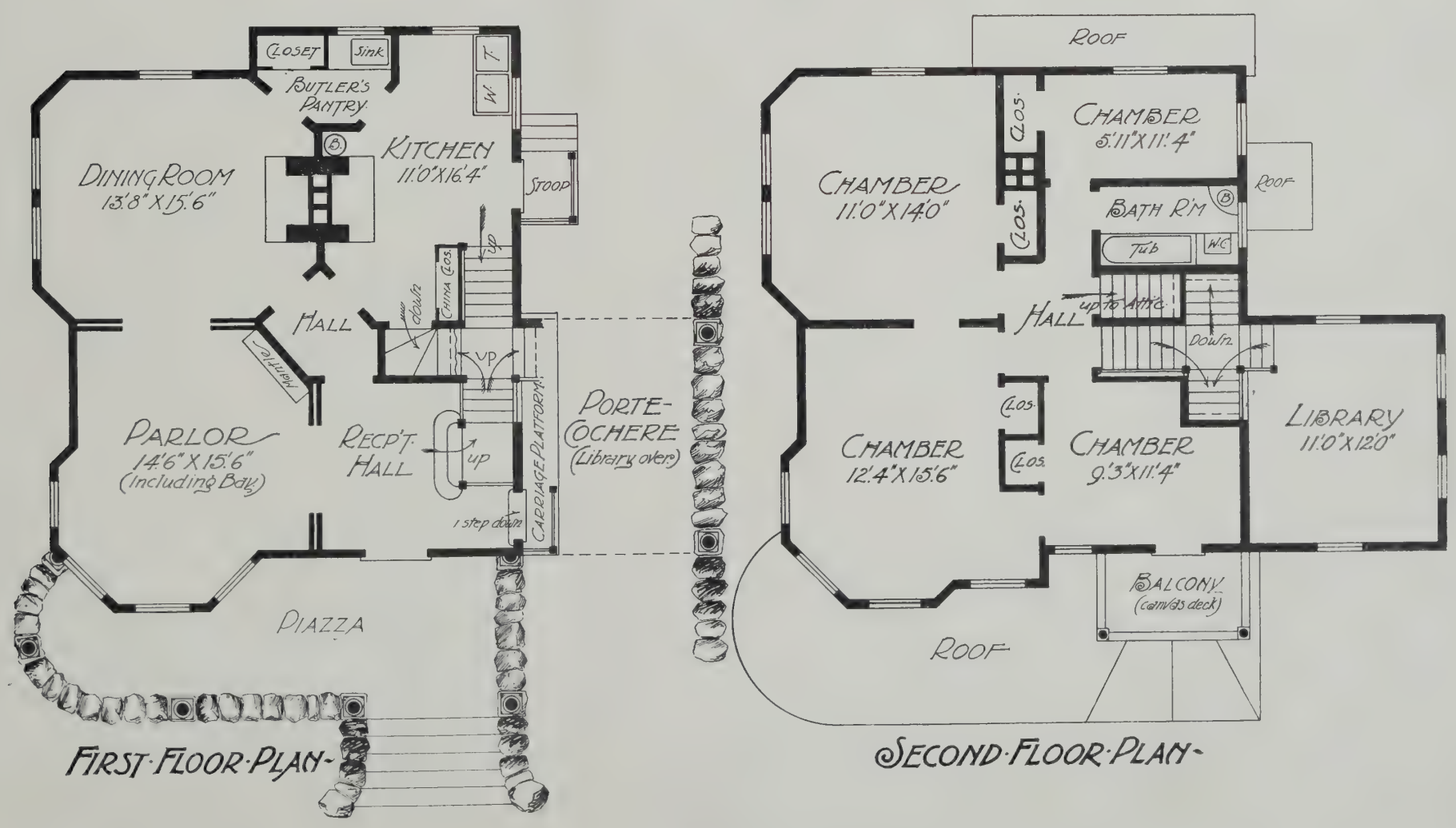


FIRST FLOOR PLAN.

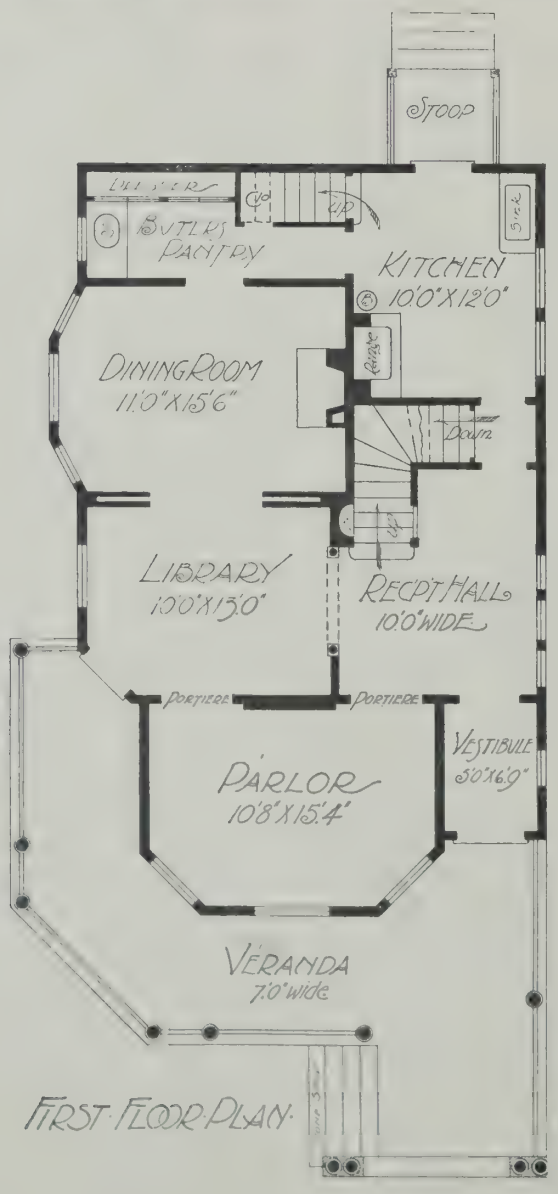


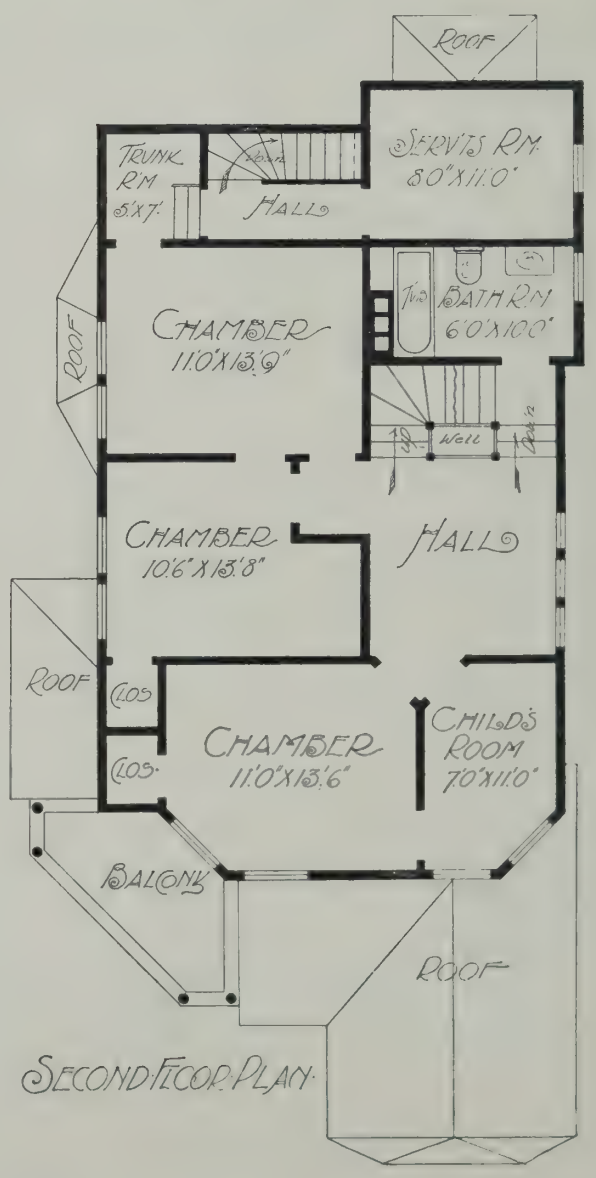
SECOND FLOOR PLAN.

GREYSTONE, A RESIDENCE AT BRONXWOOD PARK, N. Y.—See page 83.

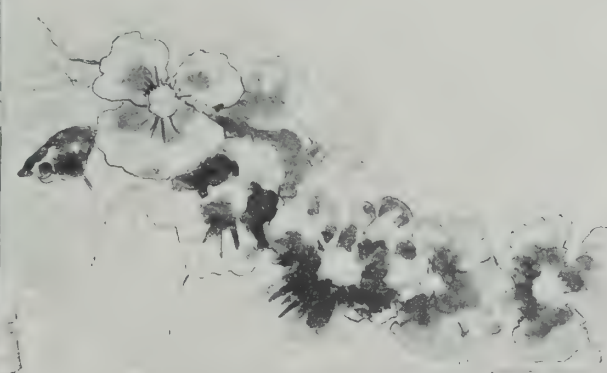


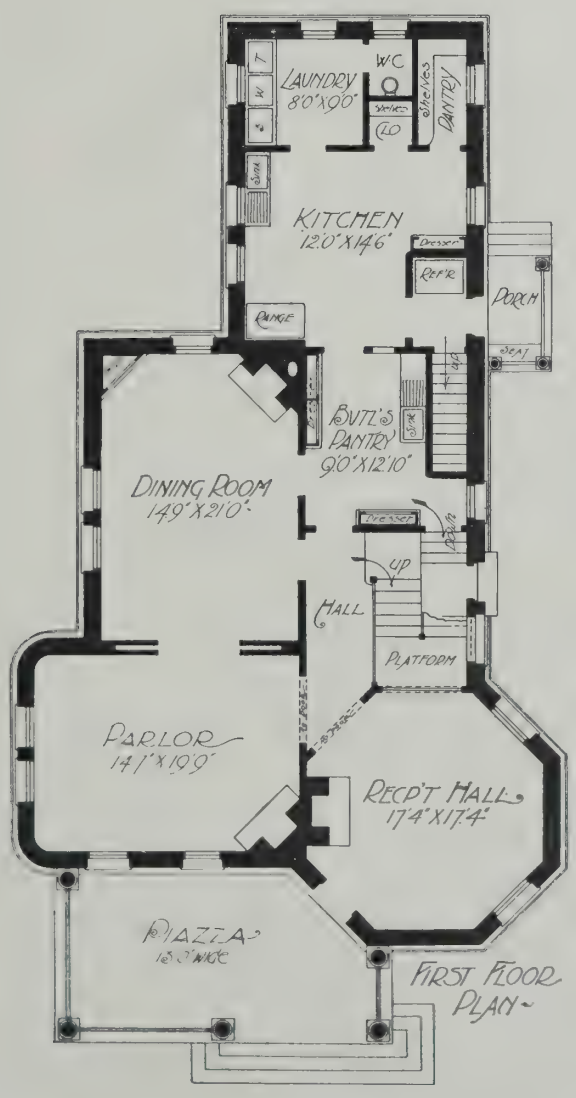
A RESIDENCE OF MODERATE COST.—See page 82.

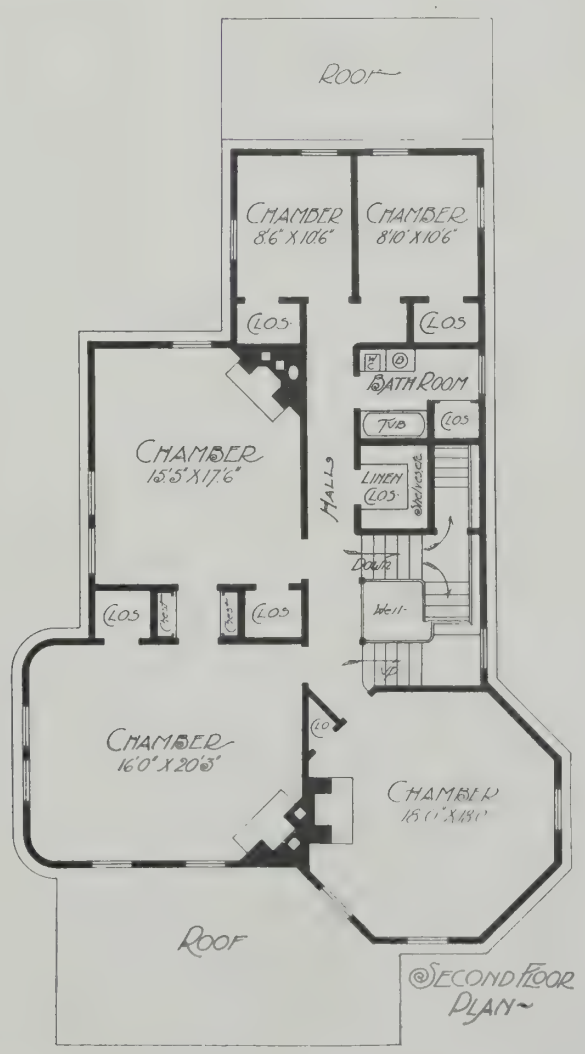




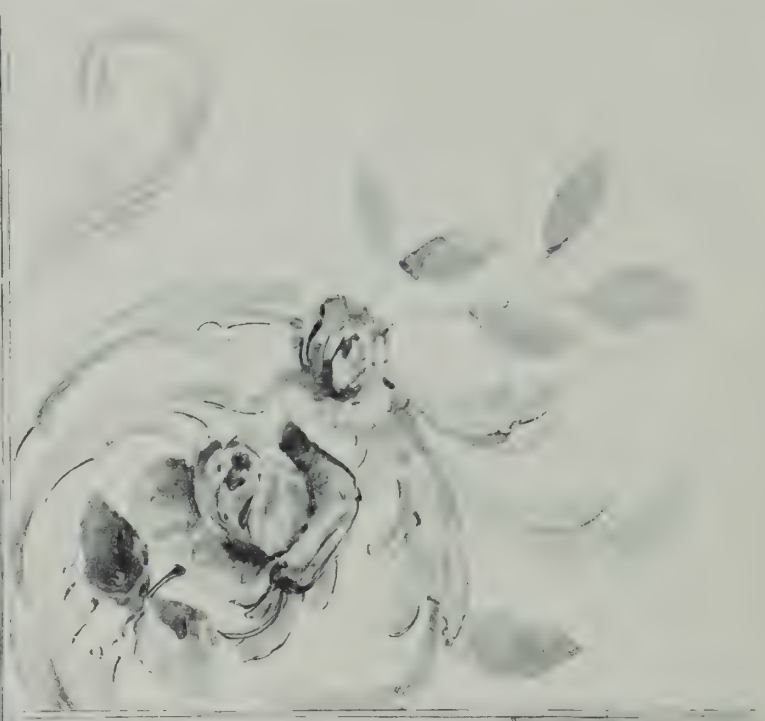
A COTTAGE AT MOUNT VERNON, N. Y.—See page 82.

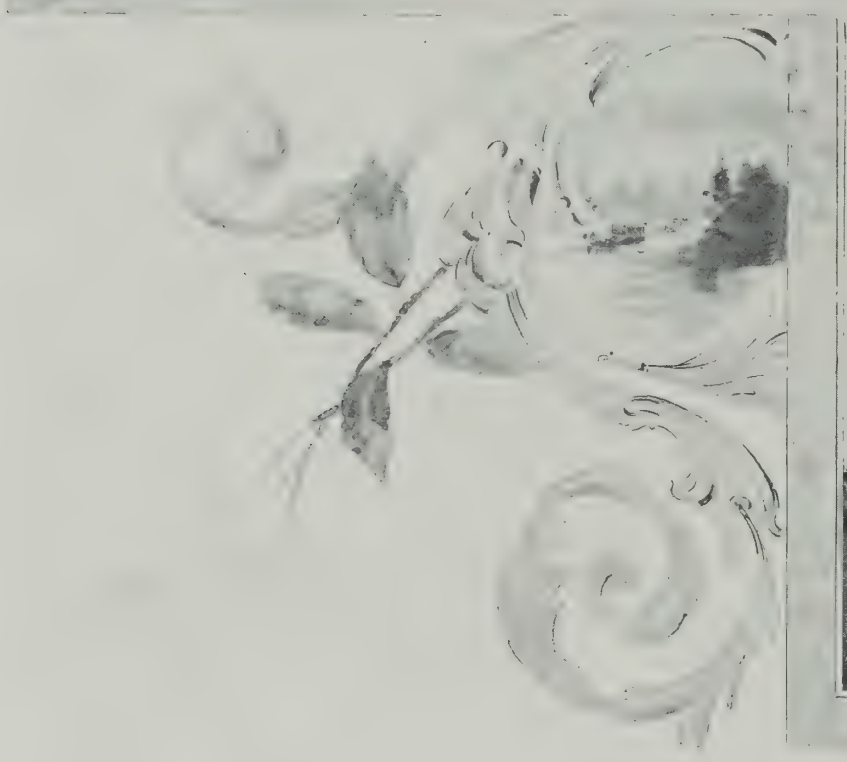


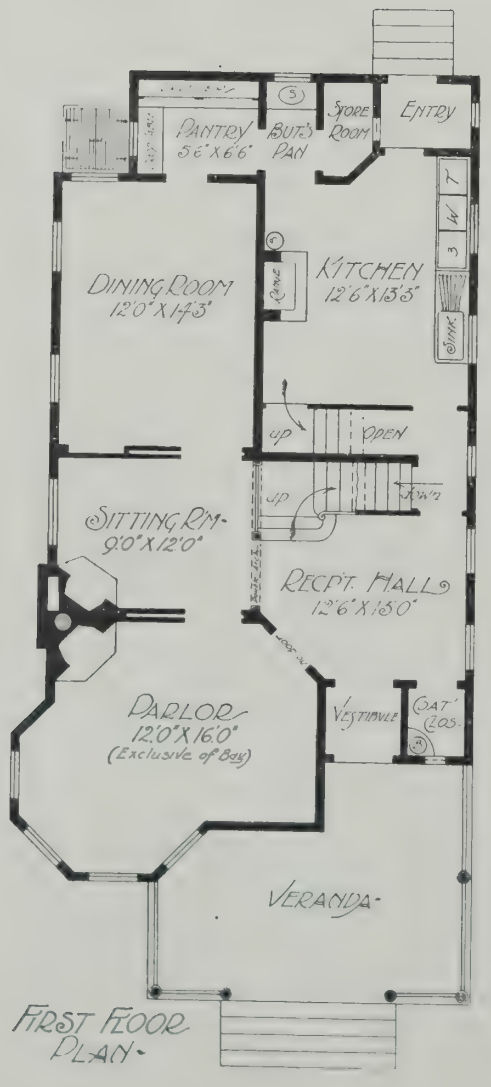


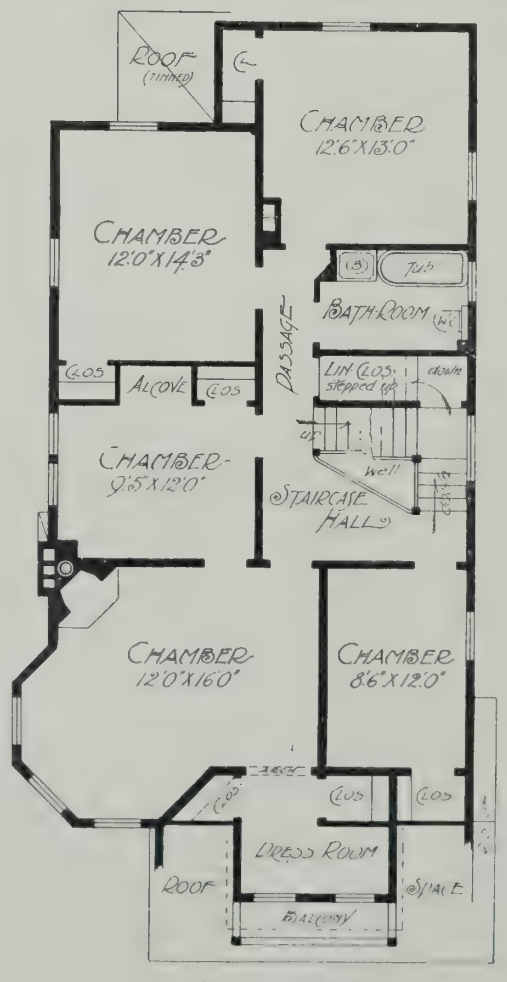


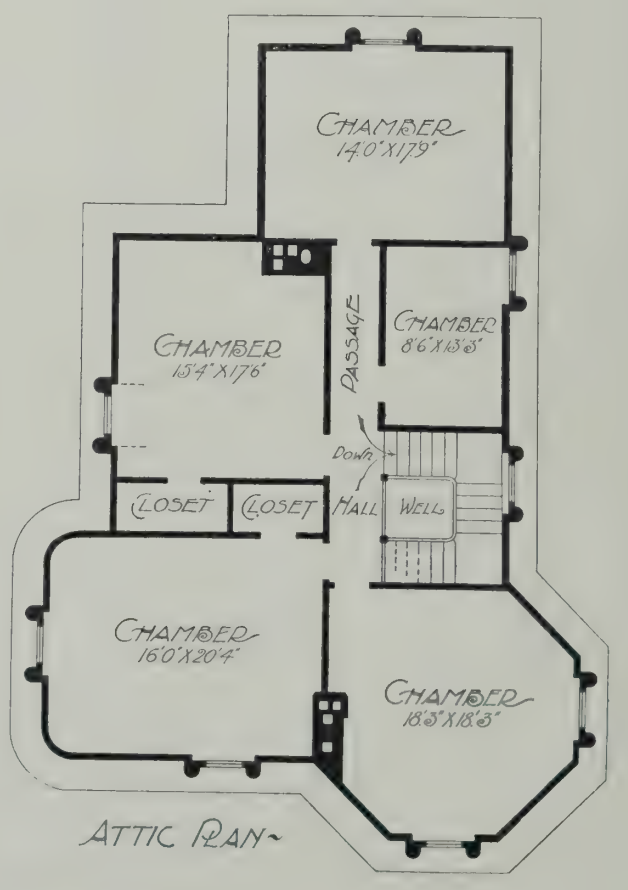
A RESIDENCE IN BROOKLYN, N. Y.—See page 82.











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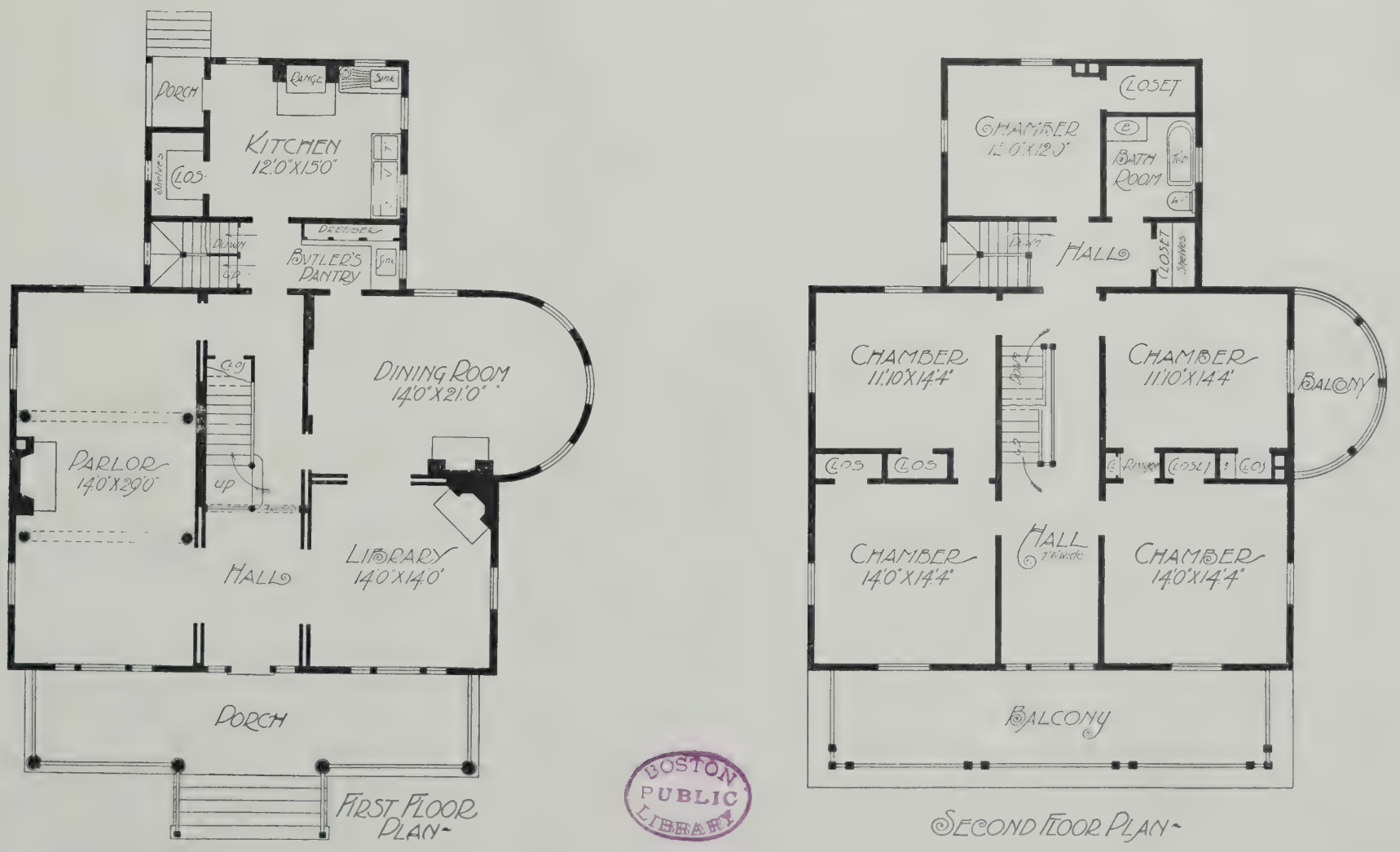

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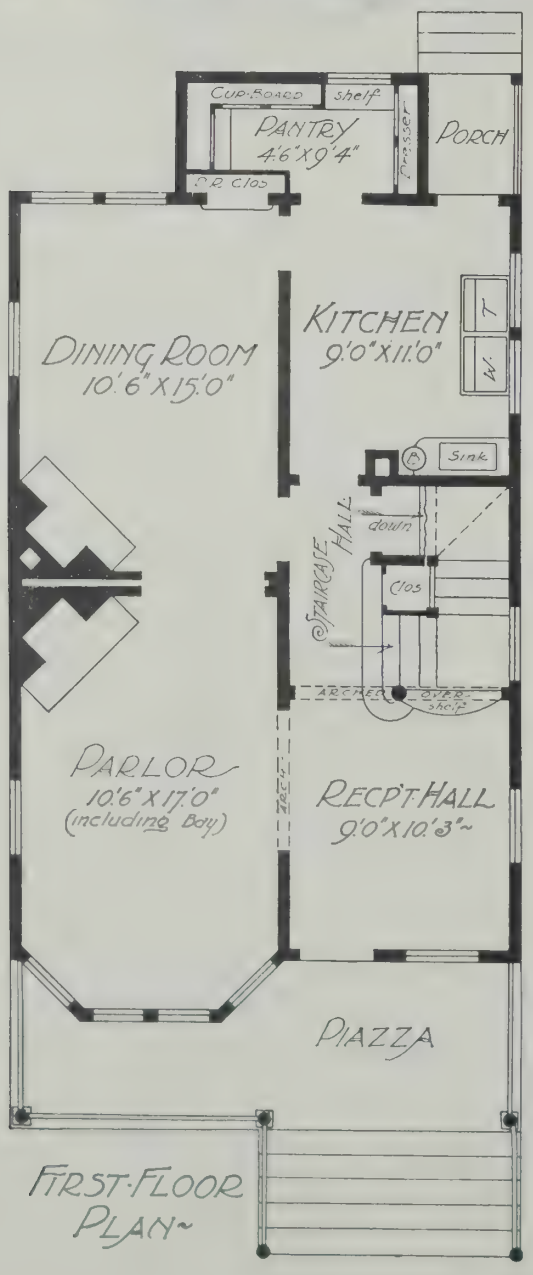
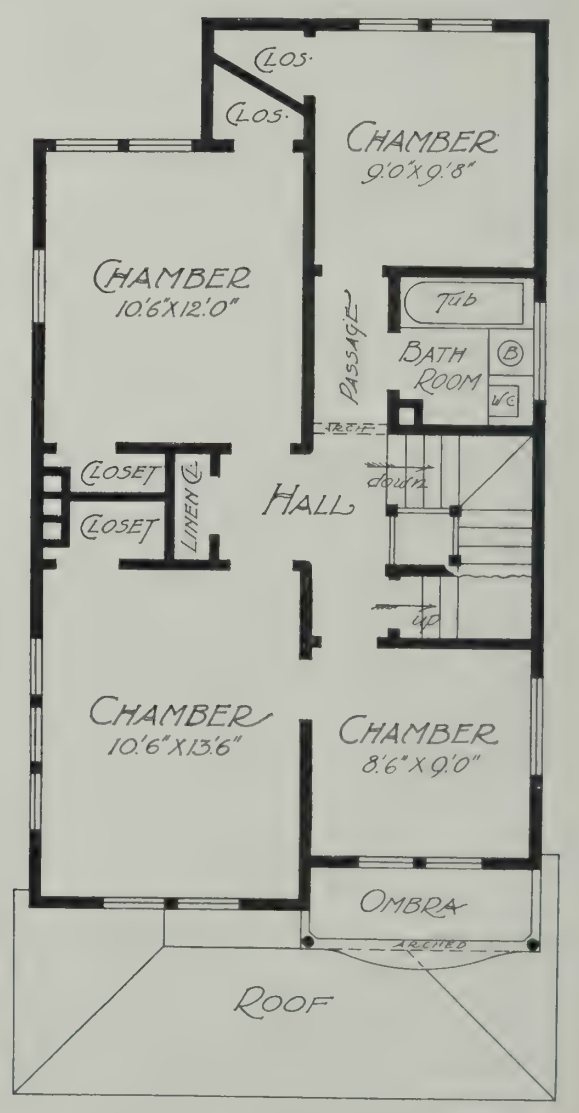
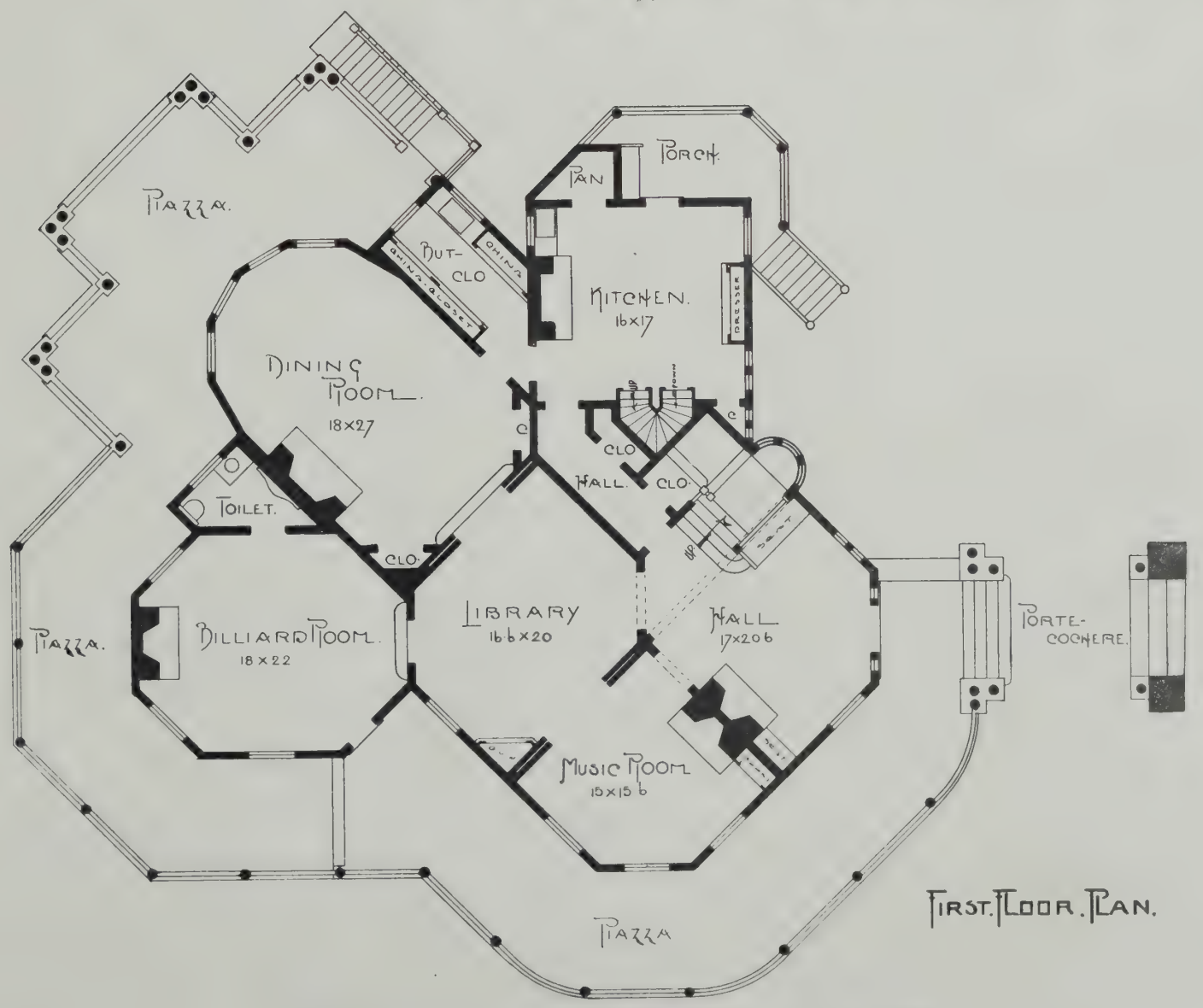




A COTTAGE AT BAYONNE, N. J.—See page 93.



FIRST FLOOR PLAN.

A RESIDENCE AT BELLE HAVEN, CONN.—See page 93.

SECOND FLOOR PLAN.

A RESIDENCE AT BELLE HAVEN, CONN.—See page 93.

A RESIDENCE AT BELLE HAVEN, CONN.

The engravings and floor plans presented on pages 91 and 92 illustrate a picturesque and well appointed residence at Belle Haven, Conn. It has been recently completed for E. C. Converse, Esq. The lines of the building are thoroughly well broken by its numerous octagonal projections, bay windows, and its broad, low, well-shaded piazza. The underpinning is built of local "rock-faced" granite, of a bluish-gray color. The building throughout is shingled, and painted Colonial yellow, with ivory-white trimmings. The roof is shingled, and painted red. Dimensions: Front, 86 ft.; side, 60 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Wall is treated in ivory-white. It has a parquet floor, paneled wainscoting, and ceiling beams. The carved pilasters extend to ceiling and support beam. The staircase is an ornamental one, with spindle balusters and newel post, extending to ceiling, and it has also a paneled seat and oriel window thrown out at first landing. The fireplace is built of buff brick, with hearth and facings of same, and provided with a neat mantel of Colonial style. A bookcase is built in on one side of fireplace, and an archway on the other side opens into music-room. This music-room is treated in China white and it has a parquet floor, bookcase, and a fireplace, trimmed with cream-white tiling, and a carved mantel, with mirror. The archways have spindle screen transoms. Library is treated with cream-white, and is provided with bookcases and a parquet floor. Billiard-room is trimmed with antique oak. It has a paneled wainscoting, ceiling beams, hardwood floor, and a "Dutch" fireplace. The toilet is conveniently located and it is paved and wainscoted with tiles and furnished with the usual fixtures. Dining-room, of large dimensions, is trimmed with oak, and furnished with a parquet floor, paneled wainscoting, and ceiling beams f rming deep panels. It is also provided with a large open fireplace and china cabinets, built in, with leaded glass doors. The butler's closet is fitted up with sink, cupboards, and closets with glass doors. Kitchen is wainscoted, and provided with large pantries, sink, and fireplace for range. Stairs lead to cellar and to third floor. Second floor contains four bedrooms, nursery two bathrooms, nine closets, and two servants' bedrooms, the latter being separated from main building. The large open hall is finished in ivory-white, and it has a seat and a paneled wainscoting. The remaining apartments are trimmed with oak, cherry, and white pine, finished in China white respectively. The bedroom over billiard-room has a ceiling ceiled with narrow beaded stuff extending up into roof. Bathrooms have wainscoting in tiles and paved floors. They are furnished with porcelain tubs and other necessary fixtures, with exposed plumbing. There are five bedrooms and trunk-room on third floor. There is a cemented cellar, containing furnace and laundry. The building was designed by Mr. Bruce Price, architect, 150 Fifth Avenue, New York, and remodeled by C. P. H. Gilbert, 18 Broadway, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

Hints to Readers.

The present number completes another year in the history of our publication, and closes the volume. We are not in doubt as to the utility of our publication. The affirmative evidence is overwhelming. Go where you will throughout the length and breadth of this great country, and on every hand will be found new and tasteful buildings, the counterparts of which were given in the SCIENTIFIC AMERICAN, from which they were planned and erected.

No publication has ever been issued in the architectural line from which so many dwellings and homes have been chosen and built. The reason is simple. In every number we place before the reader a variety of new plans and designs of the most practical nature. Not fancy sketches, of which there can be doubt as to realizing the details when the work of building is begun; but actual plans and perspectives of the latest designs of houses already erected. In almost every instance the plans we publish are produced from the buildings themselves, the perspectives being from photographs specially taken by our own artists. Therefore, when a plan is chosen from the SCIENTIFIC AMERICAN, the builder knows that it is practical. The exact details, form, proportion, dimensions, arrangement of everything, stand before the eyes, ready for the closest measurement and the most careful study.

Every family having in contemplation the building of a home should, as a matter of economy, possess this most valuable work, for in its pages, at the low cost of $2.50 a year, they have before them the best perspective examples of existing dwelling houses and the most fresh and approved interior plans therefor. This will be a great aid in selecting and deciding upon the character of the intended home, besides saving them time and money.

As to the value of this periodical to builders and architects, it is needless to dwell. It speaks for itself. What signifies to them the trifling sum of $2.50 a year, for a helper in the plan and perspective line that is so sure to aid them in closing valuable contracts amounting to hundreds and thousands of dollars?

The Education of Customers.

This country is well supplied with architectural papers, many of them ably conducted, of superior value as instructors of architects, exhibiting the theory, mathematics, principles, practice, rise and progress of architecture from the earliest ages. The aggregate circulation of these works is quite limited, being confined chiefly to purely professional architects, a comparatively small class, comprising throughout the entire country probably not over three thousand. The SCIENTIFIC AMERICAN occupies quite a different field. It aims principally to educate the customers of architects and builders. This it accomplishes by placing before them a constant succession of fresh and splendid illustrations of attractive buildings and plans. The beneficial influence of this method is very great, very practical, and is sensibly felt by architects and builders in all parts of the country. Their services are in greater demand, because their customers, no longer satisfied with cheap and ordinary buildings, now ask for the latest, the newest, and the best designs, such as the SCIENTIFIC AMERICAN brings to them.

Our paper goes to the masses of the people, who love to look at and study the representations of good buildings.

Where the SCIENTIFIC AMERICAN freely circulates, there architects and builders thrive, there property is intelligently improved; and everybody knows that property, if attractively improved, is increased in value.

The SCIENTIFIC AMERICAN has by far the largest circulation of any architectural paper in the world, because it not only goes to architects and builders, but also to *their customers*, who vastly exceed the former in number.

This, also, is the reason why the SCIENTIFIC AMERICAN has the largest advertising patronage of all the architectural papers. It is *these customers* who order and pay for the plans, and the buildings, and the plumbing, the painting, the hardware, the walling, the papering, the heating, the lighting, the decorating, the finishing, the furnishing, and every other blessed thing that is used or placed within or without the building. "We get good returns for money spent in the SCIENTIFIC AMERICAN," say advertisers, and that settles the question.

When our builders' edition first appeared, nearly all the architects were down upon it. They say we gave away their plans free to the public, and the effect would be to take bread from their mouths. But they now find, by actual experience, they were mistaken. The SCIENTIFIC AMERICAN promotes their business by educating their customers, and creating a demand for their higher and more profitable class of plans and designs.

How to Catch Contracts.

When a customer calls to talk house to an architect or builder, one of the readiest means to inform and interest him is to show the various numbers of the SCIENTIFIC AMERICAN. These are replete with photographic pictures of new and tasteful dwellings and plans. Our customer looks at this one and that, until he finds a plan that nearly suits his fancy, except that the kitchen is not just as he could wish, or the hallway, or that closet, or, "I should like it better if a dormer window were there," or some other minor change were made. To which the builder frankly replies that he understands his wishes to a dot, and will be glad to make up a plan for him; will have it ready to-morrow; and, moreover, "it sha'n't cost you a penny." This liberal and agreeable treatment is highly appreciated by the customer. After his departure, our architect or builder whips out his tracing paper, follows the plan selected, puts in the few changes suggested, perhaps adds a front elevation to the house, all involving but a short time. The customer, on calling, is delighted. The drawings look like new plans specially made for him; is satisfied this architect or builder is the man for him. His mind is at once made up, and the bargain is soon settled and closed. Such, in brief, is the way it works, and we have not related any fairy story. It is the short narrative of hundreds of actual instances. We say to architects and builders everywhere, your interests are sure to be promoted if you keep on hand and make yourself familiar with the numbers of the SCIENTIFIC AMERICAN, so that you can readily display them to your customer, and point them to examples such as they require. There is no other work like it, none that has so wide a circulation among builders, none that does them so much practical and financial benefit. It assists to educate customers up to the point of having good houses, and it does this quickly, for it employs the most effective of all means for rapid education, namely, the *attractive and truthful picture*. Nearly all the illustrations given are photographic plates made from the buildings, showing all the minute details. These plates are specially prepared for the SCIENTIFIC AMERICAN. Every number presents a new and fresh supply. They are not fancy sketches, but genuine photo plates of the objects they purport to illustrate. You cannot do a better thing for yourself than to subscribe for this paper. You cannot do a better thing for your fellow architects and builders and for your neighbors than to urge them to subscribe.

The circulation of the SCIENTIFIC AMERICAN stimulates and promotes the building of new and improved houses. We know of towns where every builder is a subscriber, and all are full of business. People who see illustrations of handsome buildings are greatly influenced thereby. A notable improvement in architecture takes place in all towns and villages where the SCIENTIFIC AMERICAN freely circulates. Improved architecture increases the value of property. This is a self-evident proposition. Therefore, do all you can to boom this important and most useful periodical. This number closes the year. Next number begins a new year. Now is the time to renew your own subscription and to add another for your friend. Can you think of a better holiday present for him?

A COTTAGE AT BAYONNE, N. J.

In this issue, on page 90, we present a Colonial residence, erected for Mr. Jos. Thomas, at No. 677 Ave. C, Bayonne City, N. J., costing, complete, $2,700. The view shows a very pleasing exterior, well shaded piazza and ombra above, gable, and dormers worked out from hipped roof being the principal features. The dentil courses enrich the design considerably. Dimensions: Front, 21 ft.; side, 43 ft. 6 in., making it suitable for single city lot. Heights: Cellar, 7 ft. 2 in; first story, 9 ft. 2 in.; second, 9 ft.; attic, 8 ft. 6 in. Reception hall, of good size, has double plaster arch at staircase, and broad single one to parlor, having large bay and angle fireplace, as has the dining room, which connects by sliding doors. Kitchen, complete with usual fixtures, has large pantry with cupboard and dresser. All plaster is sand float finish, trimmed with white pine, natural, except in hall and stairs, which are ash. Column of same wood. Second floor plan shows four chambers and bathroom, with all fixtures. Plumbing throughout, exposed. 2 ft. 6 in. stairs lead to attic, which, however, is not finished off. Cellar, cemented, contains heater, fuel storage, etc. Underpinning brick; exterior framework above sheathed, papered and clapboarded on first story: all above shingled and left to weather. Clapboards and lattice painted gray. Trimming color, cream white. Chimney of brick, capped with stone. Any further information desired may be obtained of the architect, Arthur Curtis Longyear, Esq., 126 Liberty Street, New York City.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

The Latest and Best Designs for Houses.

The present number of our journal completes the year, when an excellent opportunity will be afforded for the entry upon our books of new subscriptions.

One of the distinctive features of our publication is the presentation in every number, both in colors and in half-tone prints, of new and fresh collections of photographic views, showing recently built dwellings, and other structures, with the floor plans. In this way we place before the reader a great variety of the very latest and most approved forms of construction, not from one locality only, but selected from every part of this great country. Wherever good taste prevails in the display of architecture, especially in the branch pertaining to homes and dwelling houses, there the artists of the SCIENTIFIC AMERICAN, with their cameras, do sooner or later make their appearance.

The usefulness and influence of our periodical are now widely and permanently established. Many of those who contemplate the erection of buildings now consult its pages for good plans and elevations, which are here given in numerical profusion.

The practical builder finds the SCIENTIFIC AMERICAN to be almost a necessity for himself and for his customers. With the plans and photographic elevations which we give, the builder is enabled easily to modify or to duplicate any of the structures we illustrate.

The photographs show the exact form, position, and details of the principal parts, and the builder is never at a loss how to proceed. Of these facts we have the most abundant and convincing testimonies. Many thousands of new buildings have been and are constantly being erected in all sections of the country from the plans given in the SCIENTIFIC AMERICAN, and as a result there is to be seen on every hand a marked and growing improvement in architectural styles. Builders now aim to select, even for the cheapest houses, the most tasteful designs, and of these the SCIENTIFIC AMERICAN regularly furnishes to them an abundant and satisfactory supply.

When the design of the building is selected, and the work of construction begun, the next subject for consideration is the plumbing, the warming, the lighting, the hardwaring, the finishing, and finally the furnishing and household fittings of the building. In all these matters the pages of the SCIENTIFIC AMERICAN teem with the most valuable information. Here may be found the illustrated announcements of the most reliable manufacturers of every class of materials, goods, and appliances required in buildings. In this department of the paper upward of two hundred engravings are given in every number. The value as a convenience to the reader in having constantly at hand an illustrated, comprehensive directory of the latest productions cannot be overestimated.

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VOLUME XVIII.—JULY—DECEMBER, 1894.

Articles marked thus * are Illustrated.

LIST OF COLORED PLATES.

I. A Summer Cottage. II A Dwelling at Melrose, Pa. July.
III. A Residence at Plainfield, N. J. IV. A Residence at Edgewater, Ill. August.
V. A Colonial Residence at Portchester, N. Y. VI. Windecote –A Residence at Southampton, L. I. September.
VII. A Residence at Plainfield, N. J. VIII. A Dwelling at Buena Park, Ill. October.
IX. A Residence at Bensonhurst, N. Y. X. A Cottage at Bronxville, N. Y. November.
XI. A Residence at Bronxwood Park, N.Y. XII. A Residence at Chester Hill, Mount Vernon, N. Y. December.

MISCELLANY.

Figures preceded by star (*) refer to illustrated articles.

Diamond Cement Plaster.

This is the style of an article manufactured and brought to a high state of perfection by the Blue Rapids Plaster Company, of Blue Rapids, Kansas. It is intended especially for use in cold weather, because frost does not hurt it, and it dries so quickly that much time and expense are saved in finishing a building. The company publish a pamphlet, which will be sent on inquiry to any correspondent, with numerous testimonials of the high merit of this cement plaster.

Preserving Metals in Roofs, Bridges, Etc.

At the Montreal meeting of the American Society of Mechanical Engineers, an interesting paper was read on methods for preserving metal used in pipes, roofs, bridges, poles, construction work, etc. In conclusion, the whole question of how best to protect iron and steel from corrosion, in all the varying conditions that the wants and usages of to-day demand, seems to resolve itself into several "Don'ts" as the best method of answering it, to wit:

Don't have any scale on the metal.

Don't paint it with anything but pure linseed oil and oxide of lead or graphite paints.

Don't forget that frequent inspection and care are very necessary.

Don't let the cost and interest accounts be the governing factors in the case of protecting any metal structure on whose continuity and strength human life and safety depend.

In comparing the two paints recommended, it is claimed that a properly made graphite paint should prove more durable and a better protector than oxide of lead. Graphite has a strong affinity for metal surfaces, and experienced painters claim that, even where light colors are desirable, graphite paint should be used as a priming coat. Again, graphite is impervious to the action of heat, cold, sea air, acid or alkali fumes, which are more or less destructive agents to lead paints.

The Joseph Dixon Crucible Co., Jersey City, N. J., have manufactured a pure linseed oil and graphite paint for over twenty-five years.

A Perfect Roofing Material.

It has been conceded that Fay's Manilla Roofing answers most that is required of a perfect roof. It looks and feels like leather, will not rust or corrode, is impervious to the action of gases, and is waterproof. It will ordinarily outwear the roof of tin or iron, and is by far the most economical. It also forms a durable substitute for plaster on walls, and is largely used for this purpose. Every one who is interested in roofing can secure samples by addressing The Fay Manilla Roofing Co., Camden, N. J.

STAMPED METAL CEILINGS.

Messrs. A. Northrop & Co., of Pittsburg, Pa., who have for some time made a specialty of paneled metal ceilings and similar work, send us, for the accompanying illustration, a view of a new ceiling recently made by them for a Pittsburg bank. It has an original design of shallow stamped panel, with embossed border and special deep mouldings, which lower the border and centre piece, while showing a bold cornice. The officers of the bank and all visitors unite in commendation of the work.

STAMPED METAL CEILING IN MANUFACTURERS' BANK, PITTSBURG.

New Wood Stains.

A solution of fifty parts of commercial alizarin in one thousand parts of water, to which solution of ammonia has been added, drop by drop, until a perceptible ammonia odor is developed, will give to fir and oak a yellow-brown color, and to maple a red-brown. If the wood is then treated with a one per cent. aqueous barium chloride solution, the first named become brown, and the latter a dark brown. If calcium chloride be used instead of barium chloride, the fir becomes brown, the oak red-brown, and the maple a dark brown. If a two per cent. aqueous solution of magnesium sulphate be used, the fir and oak become dark brown, and the maple a dark violet-brown. Alum and aluminum sulphate produce on fir a high red, and on oak and maple a blood red. Chrome alum colors maple and fir reddish brown, and oak Havana brown. Finally, manganese sulphate renders fir and maple a beautiful dark violet-brown, and oak a dark walnut-brown. All the colors are said to be very fine.

Woodwork vs. Flame.

In a London paper is published a letter from Mr. F. H. Gossage, who makes some interesting statements. He says:

"I find that painting woodwork of any kind with several coats of solution of silicate of soda, and finishing with a mixture of this solution and sufficient common whiting to make it about as thick as ordinary paint, is an excellent protection against fire. Wood treated in this way will not take fire from mere contact with flame; it requires to be heated till destructive distillation begins. Then, of course, gases are given out which ignite, and the wood is gradually converted into charcoal but until destructive distillation takes place the coated wood will not support combustion. A few years since I had some screens made like ordinary doors, some prepared as I have described, and some not. They were then placed over a fire of shavings, which was kept constantly renewed. In ten minutes the unprepared screens were blazing away, and so nearly consumed that they had to be supported by an iron bar. The flames continued to lick the prepared screens for thirty minutes before the distillation commenced. After forty-five minutes the coated screens were still intact and able to support themselves; they held together for an hour, although pierced in many places with holes, and when the fire was removed they did not continue to burn. This was a splendid success, and I still have the remains of the screen. The experiments were made at my suggestion for the managers of the Liverpool Philharmonic Society, and the woodwork of their splendid hall at Liverpool was treated in this manner."

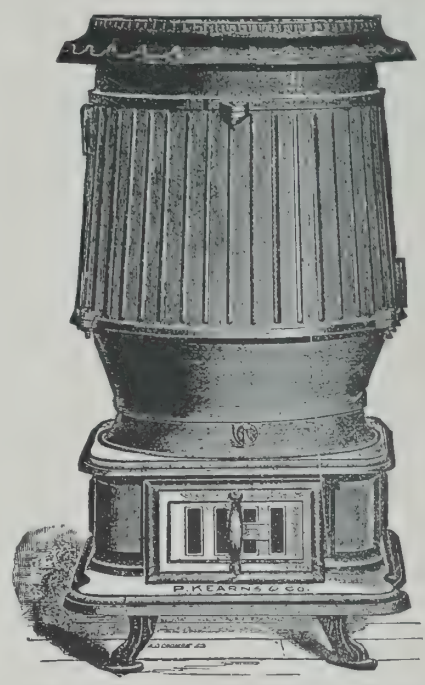
Ebonizing Wood.

Photographic Work says that the best way to produce the beautiful black so admired in certain articles of furniture, etc., is to moisten the surface with dilute sulphuric acid, and then heat until the desired stain is produced. The rationale is, of course, that the heat drives off the water, and so concentrates the acid that it carbonizes the tissue.

Such dilute acid, to which a little white sugar has been added, makes an excellent "sympathetic ink," the writing being invisible till the paper is heated, when the acid abstracts the water from the sugar, liberating the carbon.

A STOVE FOR HEATING WATER.

For economically heating water for any of the thousand purposes which may be desired, the simple and inexpensive stove shown in the illustration has many points which recommend it highly. Its construction is such that the fuel is entirely surrounded by water, whereby a large quantity of water is quickly heated at the smallest possible expense for fuel. The stoves are tested to a pressure of one hundred pounds, and, when wanted to simply heat a quantity of water, should be connected to a tank or



THE KEARNS WATER-HEATING STOVE.

boiler, after the manner of the water back of the ordinary range; and when a room or boarding-house is to be heated, the circulating pipes are similarly connected. The heat is regulated by the dampers controlling the fire to afford the desired temperature. The stoves are made in four different sizes, to give corresponding quantities of hot water per hour. The Kearns & Rudolph Range Co., of No. 1026 Arch Street, Philadelphia, make this improved water-heating stove.

Columbian Exposition Award for Copper and Brass Goods.

Messrs. Randolph & Clowes, of Waterbury, Conn., have recently received the official award granted their goods at the Columbus Exhibition. The award says:

SEAMLESS DRAWN COPPER TUBES.—Very admirable workmanship; manufacture of seamless cold drawn tubes of brass and of copper of most extraordinary size. They consist of many seamless drawn brass and copper tubes, from one-eighth inch to sixteen inches inside diameter, and up to forty feet long; also, shells for dynamite, up to fourteen inches diameter, and seamless cold-drawn copper boilers, up to sixteen inches in diameter and sixty gallons in capacity.

BRAZED BRASS TUBES.—A great variety of pretty patterns of variegated brass and copper tubing and moulding, and successfully overcoming serious technical difficulties in making them. It consists of a great number and variety of variegated copper and brass brazed tubings and mouldings. The patterns are attractive, and many involve considerable technical difficulty. The variegated and irregular tubing is made by rolling a brazed plain tube, at a single pass, between rolls which have the variegated pattern cut into their surfaces, while a mandrel inside the tube, carrying irregularly shaped rolls, forces the copper or brass tubing into the recesses in the main rolls, which are outside the tube.

SHEET COPPER.—A very striking installation and educational value of a large collection of sheet and spun brass and copper, and of copper and brass tubing very strikingly installed.

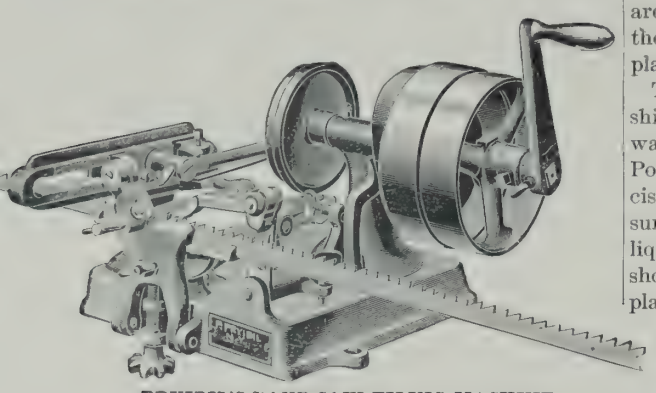
THE J. A. FAY & EGAN COMPANY, of Cincinnati, Ohio, U. S. A., received a cable recently notifying it that the Gold Medal was awarded to it for its fine display, its superb construction and wonderful ingenuity of the various woodworking machines they had on exhibition at the Antwerp Exposition.

THE PARAGON DUMB WAITER of Messrs. F. S. Hutchinson Co, No. 32 Warren Street, New York, is shown in full size working models at the Record and Guide exhibit, No. 14 Vesey Street, New York; the Brooklyn Building Materials Exhibit, 276 Washington Street, Brooklyn; Patterson Bros.' store, 27 Park Row, New York, and at the office of the company. This elevator holds load automatically, runs light, needs no looking after, and is made of capacities varying from 100 to 500 pounds.

OVER seven thousand men, it is said, have been sheltered at one time beneath the branches of one banyan tree.

AN IMPROVED BAND-SAW FILER.

The illustration represents a new machine, to be operated by hand or power, and which will file saws from one-eighth inch to two inches wide, filing the teeth fine or coarse. The machine is manufactured by P. Pryibil, of 512 to 524 West 41st Street, New York City. It files



PRYIBIL'S BAND-SAW FILING MACHINE.

125 teeth per minute, and the pawl brings every tooth to the desired place, even when the teeth are not exactly spaced from point to point. The file does not rise up straight, but rises sidewise and upward at the same time, as shown by the diagram, so that the teeth can be filed under the hook or square across, as desired. Common files of different sizes are used, such as may be had by any dealer. The machine is exceedingly simple, and a mechanic of ordinary intelligence can file a saw better on it than can be done by hand.

How to Move Large Maples.

To a correspondent who asks how to move and prune some large maple trees, six or seven inches in diameter, the editor of *Garden and Forest* replies: In removing trees, the roots are generally injured to a greater or less extent, and those which are bruised must be cut away; it is good practice to prune in the branches to a corresponding extent, so that there will be not more leaves than the roots can supply. Norway maples of the size indicated cannot be removed without the loss of many roots, and pruning will be necessary. Such pruning will be perfectly safe, as these maples are not injured more than any other trees by this operation. A great deal of this pruning can be effected by thinning out the inner branches, but there should be no hesitation about cutting back limbs where this seems necessary. When the ends of the branches are pruned, they should be cut back to a limb, the wounds should be covered with coal tar, and no stubs should be left to decay. In removing such large trees, it is good practice to prune the roots back by digging a trench about the trees, say five feet from the trunk, and if this trench is filled with good soil new feeding roots will start out during the next year, so that the tree will be in excellent condition for removing in a year from the coming winter. Large trees can be removed with success, but it costs time and care and money. Persons who do not choose to go to the extra expense, however, can console themselves with the reflection that, as a rule, it is best to plant small trees, and that a tree ten or twelve feet high will probably be as large in ten years as one planted at the same time when it was twenty-five feet high.

Value of Coverings for Steam Pipes.

A certain test of steam pipe coverings leads to the conclusion that it costs $15.40 to run 100 feet of naked two inch pipe at from 70 to 80 pounds pressure for one year of 3,000 working hours, with coal at $2 per ton. With the least efficient of insulating coverings used in the test this loss could be reduced to $4, with the most efficient to $2.64. Striking as are these figures, they are probably below the cost of actual practice, for a steam pipe is under pressure usually more than ten hours a day, and $2 a ton is below the average cost of coal. Prof. Charles B. Gibson, in some tests for the Manufacturers' Mutual Insurance Company, some years since, reached the conclusion that, with coal at $4 per ton and 3,000 working hours per year, the loss from a naked two inch pipe was 64½ cents per linear foot—considerably more than Mr. Dickinson's test would show even with coal at $4 per ton. However, the lowest of the estimates shows the importance of covering the pipes, and it is a good thing to attend to before the present loss is increased by the coming cold weather.—*Power.*

Watering Garden Plants.

Watering garden plants, as commonly practiced, is an absolute injury to vegetation, for the reason that it is not done plentifully enough. When the earth is dry and hot, the application of a little water only increases the heat, and has a tendency to make the soil more compressed and drier than before. The most of our soils are more or less calcareous, and the action of the sun's heat has the same effect as heat upon limestone. The carbonic acid is expelled, and when brought in contact with moisture heat is generated, and unless sufficient water is applied to overcome the heat, vegetation suffers. A sprinkling pot should never be used in time of drought, unless the soil around the roots of the plants is at the same time thoroughly soaked, and the watering should always take place after sunset, when the dew has begun to fall.

This is in accordance with natural laws. Rain and sunshine seldom appear together, and, further, when nature waters vegetation, the atmosphere is filled with moisture. Pool water and soapsuds are good for the garden, and cistern water may be used, but should be exposed to the sun and air through the day before applying. Strong liquid from the barnyard is death to garden plants, and should only be used after diluting until very weak. My plan of watering, to avoid making a hard surface crust around the plants, says a writer, is to dig three or four holes on the different sides of the hill a few inches away, and into these pour not less than one pailful of water, and after all has soaked in replace the dry earth, and then with watering pot sprinkle the dry earth.—*Farmers' Voice.*

Earthquake Effects on Brick Buildings.

A letter of Messrs. Ende & Boeckmann, of Berlin, to our contemporary, the *Deutsche Bauzeitung*, gives us some interesting particulars of the effects of the late earthquakes on the new public buildings these architects have erected at Tokio. We refer to the earthquake that passed over Japan on June 20 last. It seems that the shock lasted not less than four minutes and fifty seconds, and that the buildings rolled perceptibly. While all the other brick buildings suffered badly, Messrs. Ende & Boeckmann's blocks apparently withstood the shocks without showing a crack. This escape seems to have been mainly due to the precaution of tying in all the brickwork with iron bands, both horizontally and vertically, no part of the building being omitted; and, further, in building the exterior slightly inclined inward. The walls are built unusually thick. The designs purposely showed no gables, and in vaulting very narrow spans were arranged for. On referring to official information regarding the earthquake, we hear that at Tokio and Yokohama together not less than 4,551 buildings were damaged, and that sixty-one persons were killed and 428 hurt by falling houses. Thirty-two buildings collapsed completely, and eighty-one were practically razed; five bridges gave way. Of course, the majority of these buildings were of native construction; but these, as usual, appare tly withstood the shock far better than the average "European" structure.—*The Builder.*

The Trouble New York Builders Have.

A prominent builder tells one of our city contemporaries that building in New York is at the present time quite a game of chance. After the contracts are all made, the cellar blasted out, and the foundations laid, it would appear to be an easy matter to go ahead to completion.

"On the contrary," said he, "your troubles are likely to just begin. There are the stone workers, the brick contractors, the terra cotta man, the plasterers, the trimmers, etc. I've got some houses not done yet which were to have been completed by the first of September. My money is invested in an expensive piece of ground, and the houses will not be ready to catch the fall renter and buyer. Even when completed now they will probably remain vacant till next May. The stonework was delayed, in the first place, by trouble between a contractor and his men. Then the brick contractor commenced delivering the wrong kind of brick. When that dispute was settled in my favor and the brickwork begun, we were a full month behind. The terra cotta came from the West, and the bricklayers had scarcely got to it before we found certain pieces missing and had to send out to Ohio or Indiana for them. Then everything appeared to be going on satisfactorily, and we thought of catching up the lost time. But as soon as the first coat of plaster was on, a strike among plasterers broke out. We had nothing to do with it, but all our men went out just the same. This threw out the trimmers. By the time the difficulty had been settled with the plasterers we were threatened with a similar row among the trimmers and joiners. I don't know how it is going to come out. The building trades of this city are united, and no builder is really safe until he is completely out of the woods. These sympathetic strikes have so many ramifications you never know where you are. There are hundreds and thousands of dollars tied up in uncompleted work in this city—yes, and other hundreds of thousands that would go into labor if there were any certainty about it. Wherever we lose money by this, labor also loses; for it makes building cost more and makes capital timid of investment."

Twenty-five miles of the Congo Railroad, forming the first section between Matangé and Kengé, are now completed. The work has cost $100,000 a mile. The line will be 93 miles long in all, and will connect the immense waterways above Stanley Falls with the sea.

Foothold on Pavements.

Some little time ago officers of metropolitan police were deputed to make certain observations concerning road traffic generally, during the discharge of their daily duty, in the busiest thoroughfares. These observations extended over fifty days of twelve hours each day, namely, from 8 A.M to 8 P.M., and granite, asphalt, and wood pavements were considered. In one day of twelve hours no fewer than 12,366 horses and vehicles passed along Cheapside, and 5,350 along Cannon Street. During the fifty days upon which observations were taken, 542 accidents took place on wood pavement, 719 on granite, and 1,066 on asphalt. From these figures it was estimated by an expert that a horse could travel 330 miles on wood pavement during the fifty days without meeting with an accident, 191 on granite, and 132 on asphalt; therefore, the great superiority of wood pavement over all others—at least, where horses are concerned—is at once apparent. Altogether, 1,054 falls were recorded, and an analysis of this number (*London* says) affords some curious information. On asphalt, 247 partial and 190 complete falls took place; on wood, 326—only 39 complete falls. Roughly, for every fall on wood pavement four took place on granite and asphalt.

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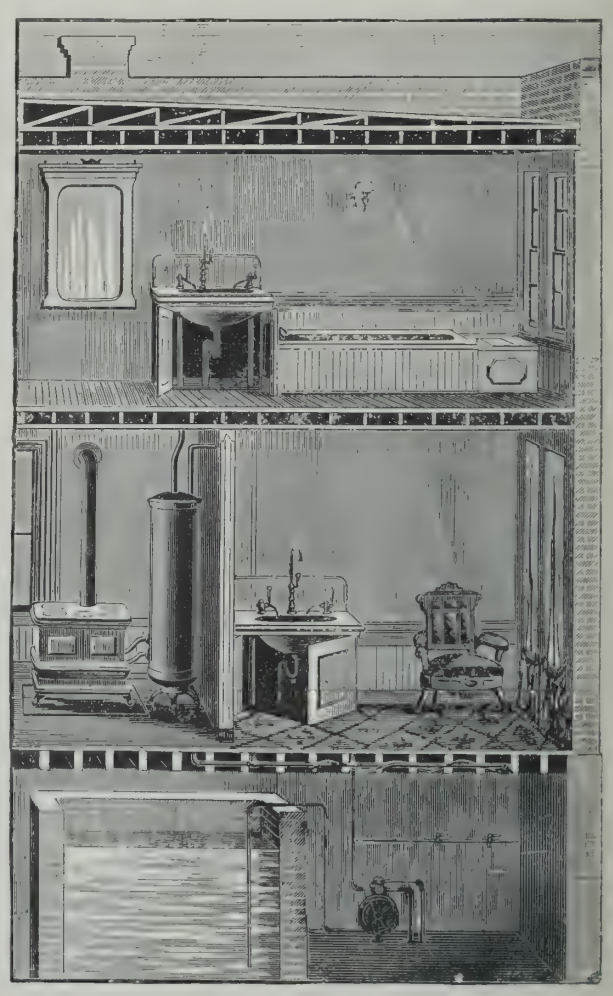
The illustration represents the application of a new hydraulic system for raising cistern water, and increasing city water pressure for high buildings, which has recently been brought out by the Erwin Hydraulic Machinery Company, of Milwaukee, Wis. By this system, water is drawn through ordinary pipes and faucets, direct from the cistern or well, in any room of the building, the same as from the city water supply. Owing to the large capacity of the machine, and its peculiar construction, storage tanks are not required. Instead of locating a water tank in the attic, by this system the water is drawn fresh and cool from the bottom of the well or cistern



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Where water tanks are already in, it can, if desired, be used to supply them. When cistern water is being elevated, it is retained constantly under the same pressure as the city water, the quantity of water drawn corresponding exactly with the amount of city water used to force it. This is claimed to be the only automatic device that will raise a sufficient supply of water to enable users to draw direct from the pipes, and so avoid the necessity of storage tanks in the attic

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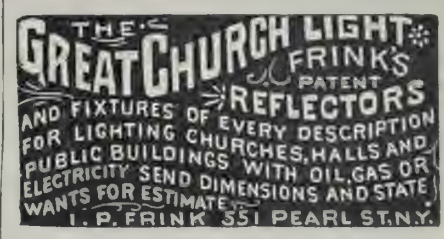

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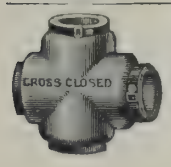

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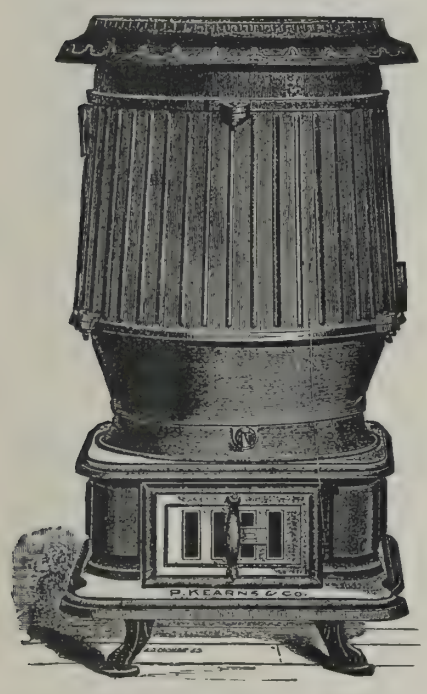

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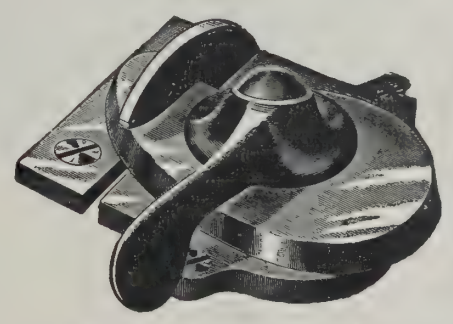

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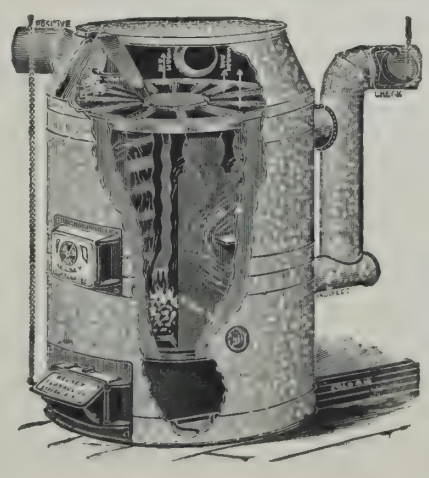

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Notes and Queries.

(1) J. H. J., Shanghai, China, writes: Will you please tell me through the columns of the SCIENTIFIC AMERICAN how the rule for ascertaining the fall of the earth's surface for any given distance is obtained? The rule, I believe, is as follows: For the first mile, a fall of eight inches; for other distances, multiply by the square of the distance in miles. A. The rule, as stated by our correspondent, is an approximate one only, and is derived from the formula of the United States Engineers, viz.: Square of the distance in feet divided by the earth's equatorial diameter in feet equals the amount of curvature in feet. This being for curvature alone, a correction for refraction must be made, making the formula $(1-2m)\frac{D^2}{2R}$, in which D = distance in feet, 2 R = twice the earth's radius in feet, and m = 0·075 in feet.

(2) W. H. C. says: Will you please explain the way that nails are graded, just what is meant by a tenpenny, a ninepenny nail, also what is the relation between the length and name of nail? A. We give the name, size, and weight of nails, as follows:

Threepenny	1·25 in. long.....	420 per lb.
Fourpenny	1·3 " "	270 " "
Fivepenny	1·75 " "	220 " "
Sixpenny,	2· " "	175 " "
Eightpenny	2·5 " "	100 " "
Tenpenny	3· " "	65 " "
Twelvepenny	3·25 " "	52 " "
Twentypenny	3·5 " "	28 " "

The lengths are standard for all kinds, but the number to a pound varies with different makers and for the different kinds, as ordinary, light, and finishing nails.

(3) N. L. M. asks how to preserve bird skins. A. Make an incision from the breastbone to the vent; with a small piece of wood work the skin from the flesh. When the leg is reached, cut through the knee joint and clear the shank as far as possible, then wind a bit of cotton wool on which some arsenical soap has been put round the bone; do the same with the other leg. Now divide spine from root of tail, taking care not to cut too near the tail feathers, or they will come out. Next skin the wings are far as possible, and cut off. The skin will now be entirely clear of the body. The skin must now be turned inside out, and the neck and skin gently pulled in opposite directions till the eyeballs are fully exposed. The whole of the back of the head may be cut off, and the eyes and brains taken out and their places filled with cotton wool. The whole skin should be rubbed well with arsenical soap or plain arsenic, and the neck returned to its natural position, when, after filling the body with a little dry grass or wool, the job is done. It is very easy, and the skin of a bird is much tougher than one would suppose, though of course they vary, the night jar being very thin, while humming birds are fairly tough. All the apparatus required is a sharp knife and a pair of scissors, or, for large birds, a strong pair of nippers to divide the bones. From the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(4) T. C. B. asks: What amount of power can be gained from 1 inch of water running from a reservoir or barrel of 50 gallons capacity with a pressure of 6 feet? And what wheel is the best and most powerful in this case? A. If a miner's inch is the measure, you will have $\frac{1}{1000}$ of a horse power under 6 feet head, and the 50 gallons would last about 4½ minutes. A small impact wheel of the Pelton type would give the best economy.

(5) H. M. W. says: A friend of mine, a practicing physician, carries a tie weight in the front of his buggy, and it continually winds up the strap. The movement is from right to left, or against the sine. It does not seem to matter how the buggy is loaded. Can you explain the phenomenon? A. The turning is probably due to jarring of the vehicle and slight projections on the bottom of the weight.

(6) W. V. S. asks: Will water boil in a pot set in another pot of boiling water? If so, how? A. No; not unless you put salt in the water of the outer kettle. Brine boils at a higher temperature than water.

(7) L. H. E., Kansas, says: On September 20, at 6.30 o'clock in the morning, the sun shines in a tunnel, or, if you were to stand at one end and look through, you could see the sun at the day and hour mentioned. What is the per cent. of the grade of the tunnel, and how do you get it? A. On September 20 the sun is on or near the equatorial plane, and for the assumed latitude of 40 degrees north the sun's path is inclined 50 degrees from the plane of the horizon at sunrise. At that date it rises about 14 minutes before 6, which, added to the time of observation, makes it 44 minutes on its course from the horizon. Then 44′ × by the cosine of the latitude = 33.7′, the vertical altitude. As 4 time minutes are equal to 1 degree $\frac{33.7'}{4} = 8.42$ degrees, to which should be added 0.11 degrees for refraction at that altitude, making 8.53, or 8 deg. 31 min., the sine of which is 0.148, or nearly 15 per cent. as the grade of the tunnel.

(8) F. G. C. writes: I have a telephone wire stretching from a pole to the house, a distance of 40 feet perhaps. It hums a great deal, and particularly at night and in cold weather. I have put an appliance called an anti-hummer or anti-singer at the house end of the line, but it does no good. Could you tell me, if I also put another anti-singer at the pole end, if it would help it? Also, what is the reason it sings in the night time? A. Try changing the tension of the wire. An intermediate insulator placed to one side of the centre of the wire might answer. It hums when its natural period coincides in some way with the wind actuating it. The extra anti-hummer would probably improve it.

(9) F. M. M. writes: I wish to know how large an air pump, running at, say, 200 feet piston speed, should hold a pressure of 30 pounds per square inch, with ¼ inch nozzle outlet, open wide. Roper says steam has a velocity of 1,601 feet per second at 30 pounds pressure. Now, figured on this basis, how much air will be delivered from ¼ inch orifice, or

(*Continued on page* vi.)

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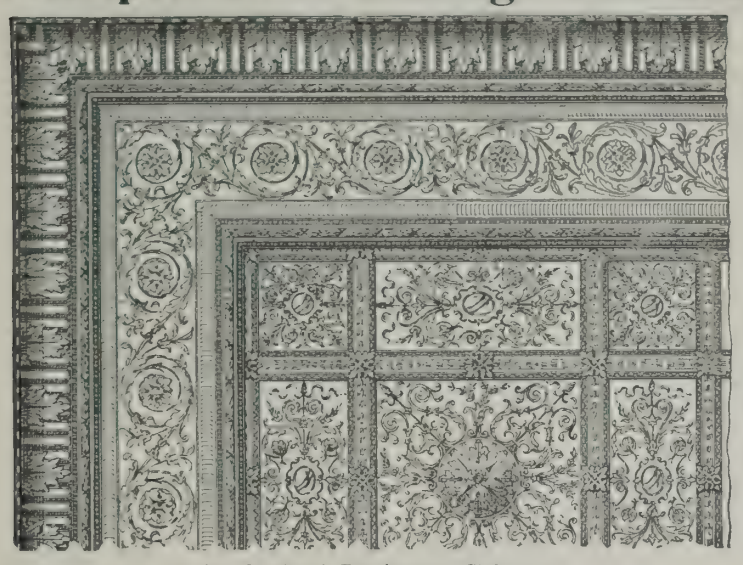

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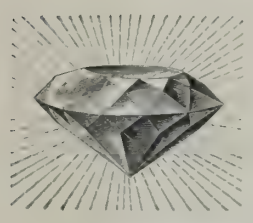

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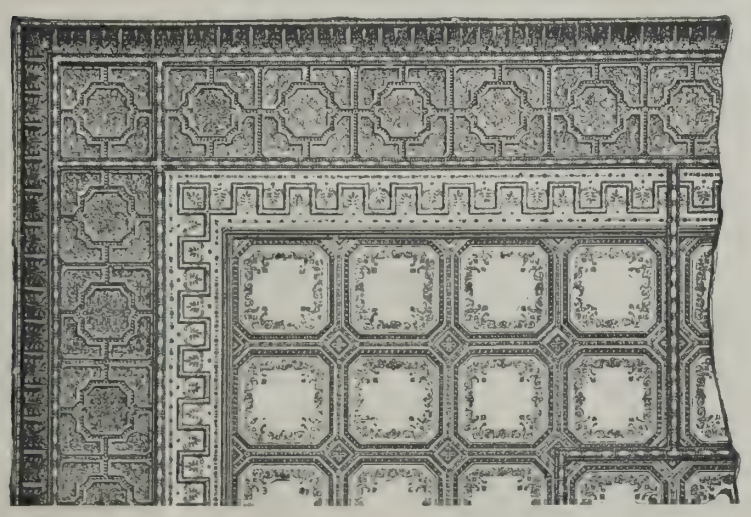

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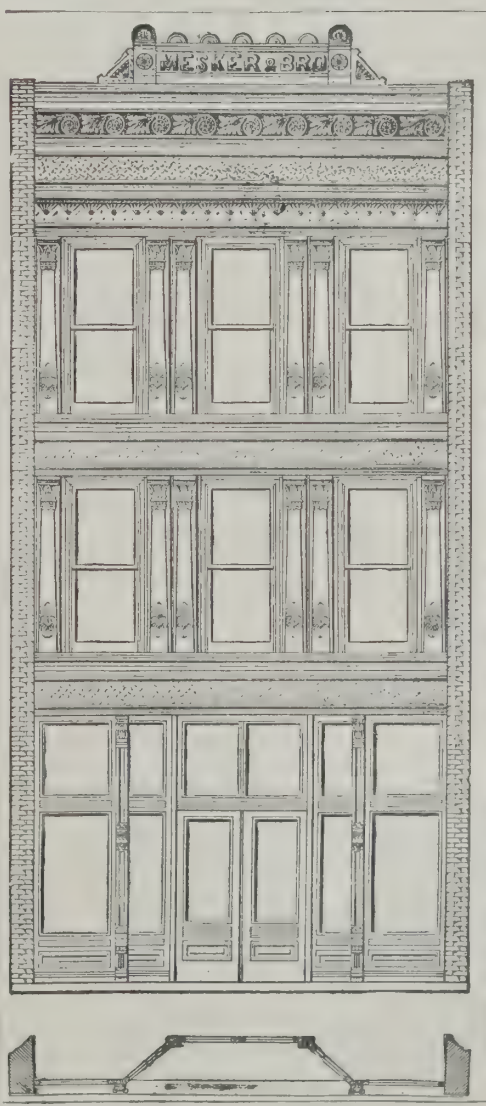

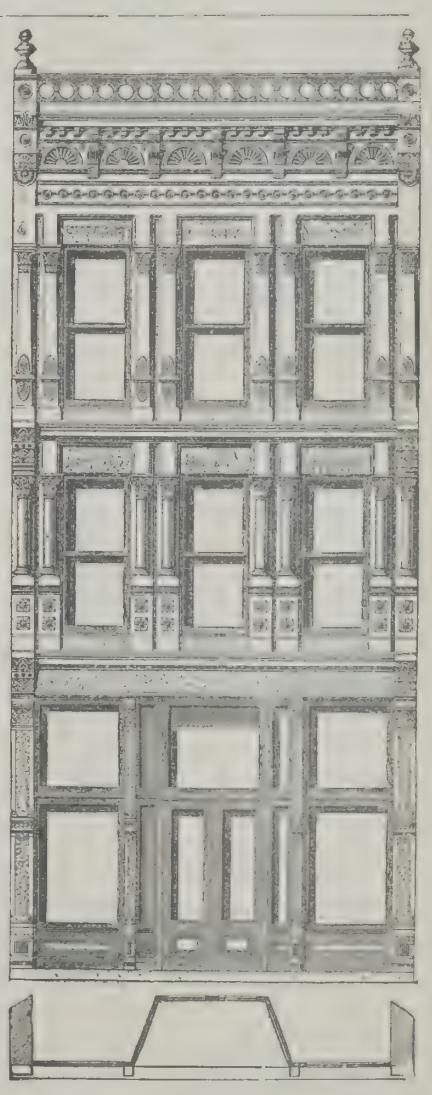

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(*Continued from page* vi.)

nerves to the effect of low radiant heat from enlarged metal surfaces; nor is the phenomenon confined to metal alone, as attested in our boyhood, when we enjoyed the low radiant heat from the sunny side of a barn in the cool autumn weather. The radiant heat from a lamp diverges in all directions, and only the area of the body intercepts it, while the extended surface of a sheet iron drum intercepts and converts the entire divergent radiant heat into convergent radiant heat from a large surface, and its effect upon the nerves is to make us feel warm without an actual increase of heat energy from the lamp.

(13) A. P. H. S. asks for a formula for treating wood patterns to give them the smooth black appearance. I have tried a number of paints and pigments, but thus far have been unable to find anything that will answer. A. Stir refined lampblack into brown shellac varnish until it contains enough of the pigment to cover well. Strain through cotton cloth. Apply two coats. After the first coat is dry, rub down with fine sand paper or emery paper. After the second coat is dry, rub with hair cloth or a bunch of horse hair, and finally apply a thin coat of brown shellac with a camel's hair brush.

(14) W. H. S. and A. K. W. ask for a cement for lining acid tanks. A. An oaken trough will last from twelve to fifteen years if coated with Burgundy pitch 1,500 grammes, old gutta percha in shreds 250 grammes, pounded pumice 750 grammes. Melt the gutta percha, mix with the pumice, and add the pitch. A hot iron passed over the surface smooths it, and assists adhesion. The box resists sulphate of copper baths, but not cyanides.

(15) A. C. B. asks: 1. Is gas burned through a Bunsen burner injurious to health, if supply of fresh air is sufficient in a room? A. It is not injurious if the burner is of proper construction and is in good order. 2. What is the temperature of a Bunsen flame? A. It may rise in the hottest part of the flame to over 2,700° Fah. 3. What is the temperature of a common flame? A. It may rise in the hottest part of the flame to 2,400° Fah. 4. What is the per cent of air burned with a common and with a Bunsen burner? A. Both burn the same, the amount varying with the composition of the gas; about ten of air to one of gas is a fair average for good gas. Flame temperatures depend on the composition of the gas. We have published a number of excellent papers on flame temperatures and the physics and chemistry of flames in our Supplement, Nos. 701, 846, 848, 850, 857, 867, 892, 930, 941, 942.

(16) P. H. W. asks: How much and what size of wire to use on a small dynamo, to get 110 volts and 8 amperes, on field and armature, also whether to connect it up in shunt or series. Does putting more and smaller wire on the armature increase the voltage and current, and what is the cause? A. These are matters of calculation. Sloane's "Arithmetic of Electricity," $1 by mail, gives examples. Smaller wire on the armature increases voltage by causing more lines of force to be cut per unit of time. It decreases the amperage by increasing the resistance. 2. In your paper you once said, if a 1 horse power machine was doubled in all its lineal measurements, it would have just 64 times more power. Is this correct? A. The relative power of dynamos and motors varies approximately with the sixth power of the size. Some authorities, however, take the fifth power $(2)^5=64$.

(17) M. J. W. asks for a formula for economical fuel. A. Mix coal, charcoal or sawdust, 1 part; sand of any kind, 2 parts; marl or clay, 1 part; in quantity as thought proper. Make the mass up wet into balls of a convenient size, and when the fire is sufficiently strong place these balls, according to their size, a little above the bar, and they will produce a heat considerably more intense than common fuel, and insure a saving of one-half the quantity of coals. A fire thus made up will require no stirring nor fresh fuel for ten hours.

(18) F. R. B. writes: I have lately made a fish pond, and would like to know if there is any way of giving fish air during winter time besides cutting a hole in the ice? A. A small hole only is needed in the ice, through which a pipe may be inserted and air blown under the ice as often as required by a bellows or air pump. With a hand-driven air pump the tube can be thrust down to the bottom, and the water thoroughly aerated.

(19) W. D. S. asks: Is there any trouble experienced with fire hydrants from freezing? And if so, what is the cause? Is it from difficulty in getting rid of the water in the hydrant after it is shut off from below? A. When fire hydrants are properly set with a cesspool and waste for draining the hydrant when closed, there should be no trouble from freezing. If the waste hole is not provided, or gets stopped, the hydrant will remain full of water and will freeze solid in cold weather. In cold climates the valve of a hydrant should be 5 feet below the surface, with a pit sufficiently large to quickly absorb the water wasted, and from leakage of the valve.

(20) W. P. M. says: I am making a water tube boiler on the porcupine plan. Is there any objection to using pipe for the porcupine as small as half an inch, where the pipes will be two feet long? A. Half inch tubes, 2 feet in length, are too small for a porcupine boiler; the circulation will be sluggish and cause the boiler to lift its water by the accumulation of steam in the small tubes, so fast as to push the water out. The fouling of small tubes is also an objection. Not less than 1 inch tubes should be used, with as large standpipe as possible; will make the best working boiler. 2. As regards speed, are hollow or straight water lines desirable for a steamboat? A. The concave bow and stern water lines or wave lines

(*Continued on page* xi.)

DISPOSAL OF THE GARBAGE AND

Waste of Cities.—By W. F. Morse. A statement of what, during the last two years, has been added to our knowledge on the subject of the disposal of city garbage and refuse; with special reference to the disposal by fire of the organic waste and garbage of the Chicago Fair. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 938. Price, 10 cents. To be had at this office and from all newsdealers.

WATER-TIGHT MASONRY DAM,

Construction of.—By Walter McCulloh, Jr. Details of construction of the Sodam dam and methods adopted to make it perfectly water-tight. With 4 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 914. Price 10 cents. To be had at this office and from all newsdealers.

DECORATION — A LECTURE DE-

livered by Mr. Louis Solder at Heriot-Watt College, Edinburgh, before the students of the painting and decorating classes. With 2 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 916. Price 10 cents. To be had at this office and from all newsdealers.

(*Continued from page* viii.)

are the lines for speed. 3. I am using in my launch an oil-burning boiler. Oil is fed to boiler by steam, which is very objectionable for many things, especially noise. Can you tell me a simple way to make a vaporizer, so I can burn oil in the form of vapor instead of spray? A. There is no method of burning oil under a boiler better or safer than the jet spray, either air or steam. The air jet makes the cleanest fire, but the combined steam and air jet is most convenient and in general use. The steam and air jet has not been considered objectionable when properly regulated; perhaps your steam nozzle is too large and carries too little air into the fire chamber; try a smaller steam nozzle combined with an annular air nozzle for the atomizer.

(21) Richmond says: If you take a tub of water weighing 50 pounds (tub and water), the tub being half full of water, and put a 5 pound live fish in the tub of water, none of the water being forced out, will the tub of water weigh any more with the live fish in it than it will without it? If so, how much, and how do you account for it? A. The tub, water, and fish will weigh exactly 55 pounds. This old yarn has been answered many times in this journal, and many more directly. We are in hopes that some of our readers will eventually get out of this class of ruts, take to the physical facts of nature, and come to the conclusion that nothing comes from nothing, and that one and one make two every time. Everything that has weight when added to a weight increases the weight, whether animate or inanimate, fluid, air or gas.

(22) J. H. R. writes: I have an electric bell from tank to house that rings when tank is full; the connection is made under water by a float pulling a brass wire against a copper wire above it. The copper wire will corrode in a few hours, so that a connection will not be made Will you kindly help me out? A. We think you cannot expect good results from your electric circuits until you place the contacts outside of the tank. This you can readily do by connecting a rod with the float.

(23) J. J. H. asks: 1. How high above the level of its source will an ordinary hydraulic ram raise water? A. The ordinary water rams will force water to 100 feet, and in small quantity under favorable conditions to 200 feet, if the distance is not excessive. See the possibilities and computed conditions for hydraulic rams in SCIENTIFIC AMERICAN SUPPLEMENT, No. 793, 10 cents mailed. 2. Will a sheet of zinc burned in a stove loosen soot in a chimney? A. The burning of zinc is said to loosen soot in a chimney. We apprehend the cause to be in the deposit of zinc oxide on the surface, which prevents the soot from sticking. The burning of zinc should be done after a chimney has been cleaned. 3. Does the temperature of steam increase with the pressure? A. The temperature of steam increases with the pressure. 4. What is taggers iron? A. The brand of iron from which tin plate is rolled.

(24) H. C. W. asks how many storage cells it would take to run the motor 641 to the best advantage, and can the motor be used as a dynamo to charge the batteries? A. Four cells of storage battery will run the motor. It is not adapted for use as a dynamo.

MUD: A MATERIAL IN PERSIAN and Eastern Architecture.—By William Simpson, R.I., M.R.A.S. An interesting London Society of Arts lecture on the mud-built structures of the East. With 7 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 865. Price 10 cents. To be had at this office and from all newsdealers.

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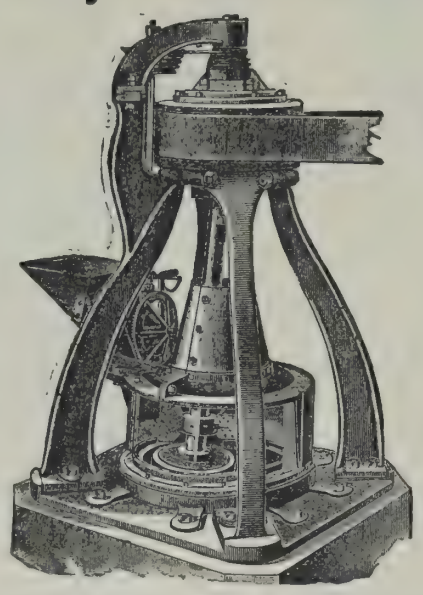

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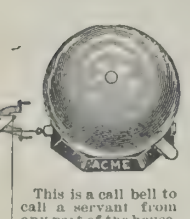

This is a call bell to call a servant from any part of the house, and is worked by foot, as shown in cut of dining scene. When in use it has a patent locking device to allow it to be raised above floor. When not in use it can easily be unlocked and allowed to be flush with floor, so it is out of the way for sweeping, etc. This bell is made in sizes from 3 to 7 in

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" 492,779,	"	March 7, 1893.
" 447,538,	"	" 3, 1891.
" 361,048,	"	April 12, 1887.
" 504,705,	"	Sept. 12, 1893.
" 447,537,	"	March 3, 1891.
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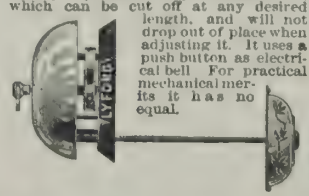

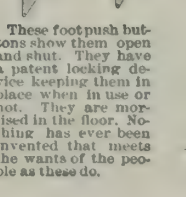

These foot push buttons show them open and shut. They have a patent locking device keeping them in place when in use or not. They are mortised in the floor. Nothing has ever been invented that meets the wants of the people as these do.

This is a long-ranged mechanical electrical bell, worked either by a push button or pull knobs; can be used in houses already wired without changing of attachments. It is the only practical long-ranged mechanical electrical bell ever invented. It is the wonder of wonders among house bells. Uses no batteries, has no grounding of wires or breaking of circuits. When once properly hung all care and expense ceases.

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This shows a local bell wound from the center, showing the way it gets its power They are made in sizes from 3 to 7 in. in diam.

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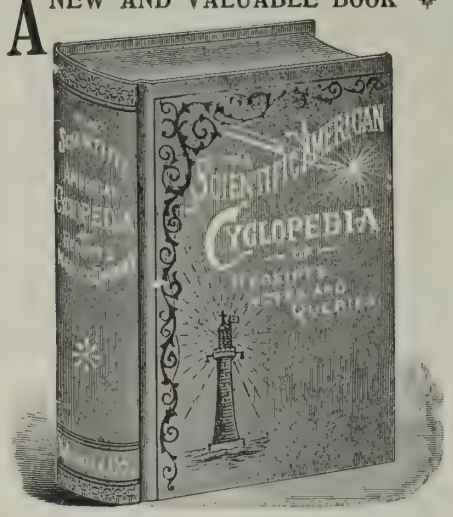

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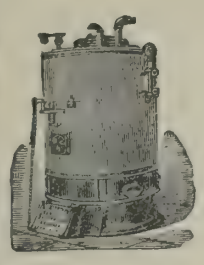

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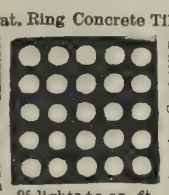

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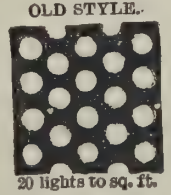

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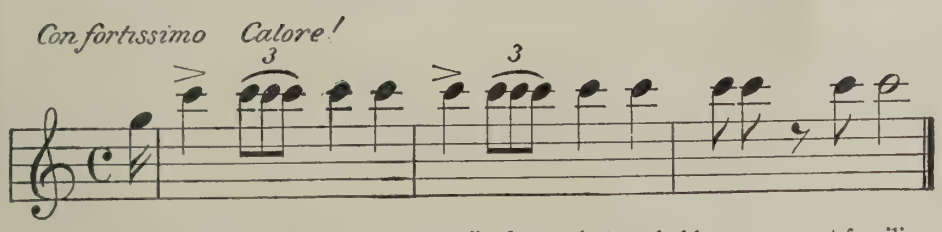

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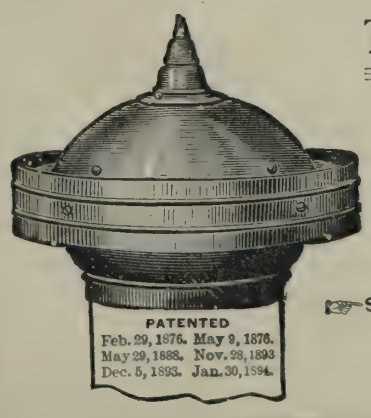

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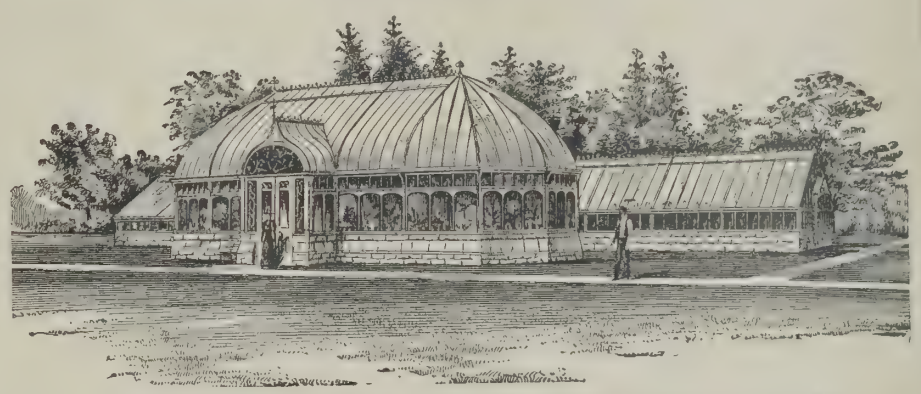

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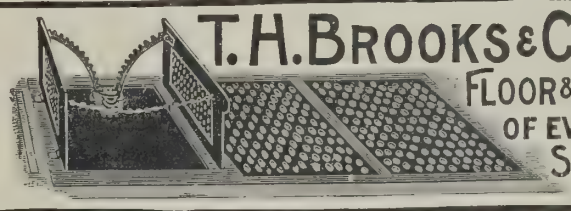

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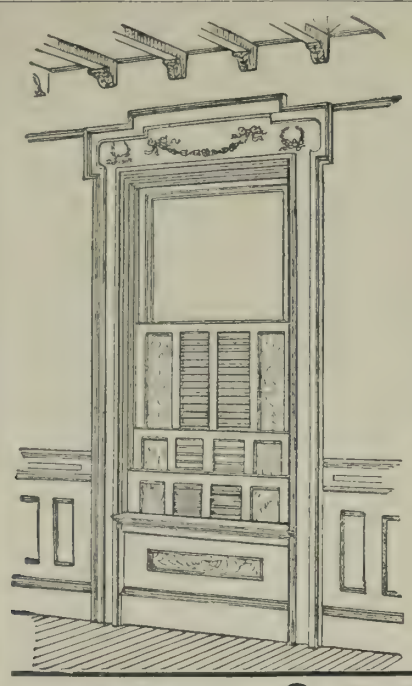

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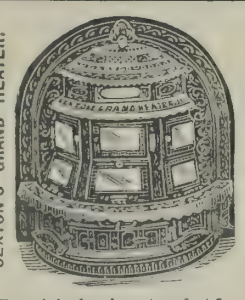

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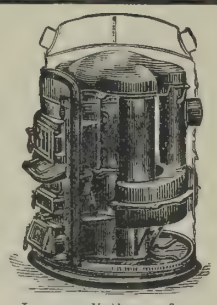

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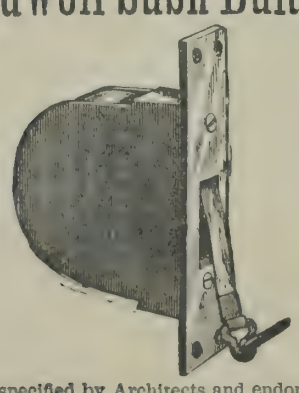

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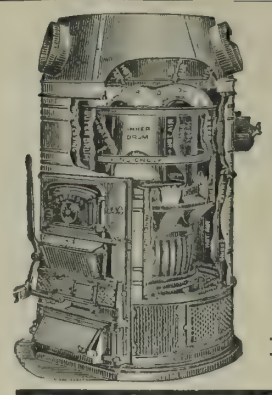

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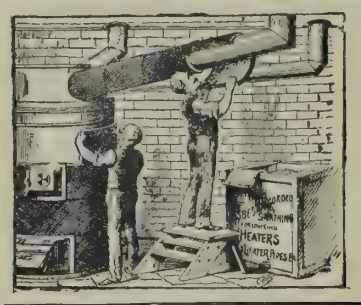

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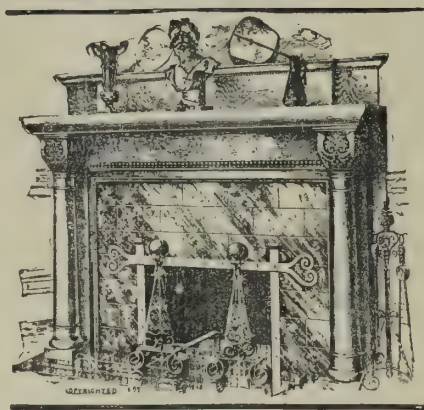

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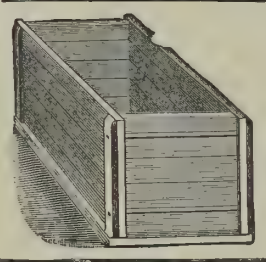

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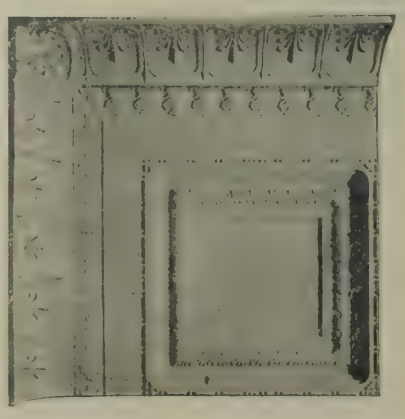

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